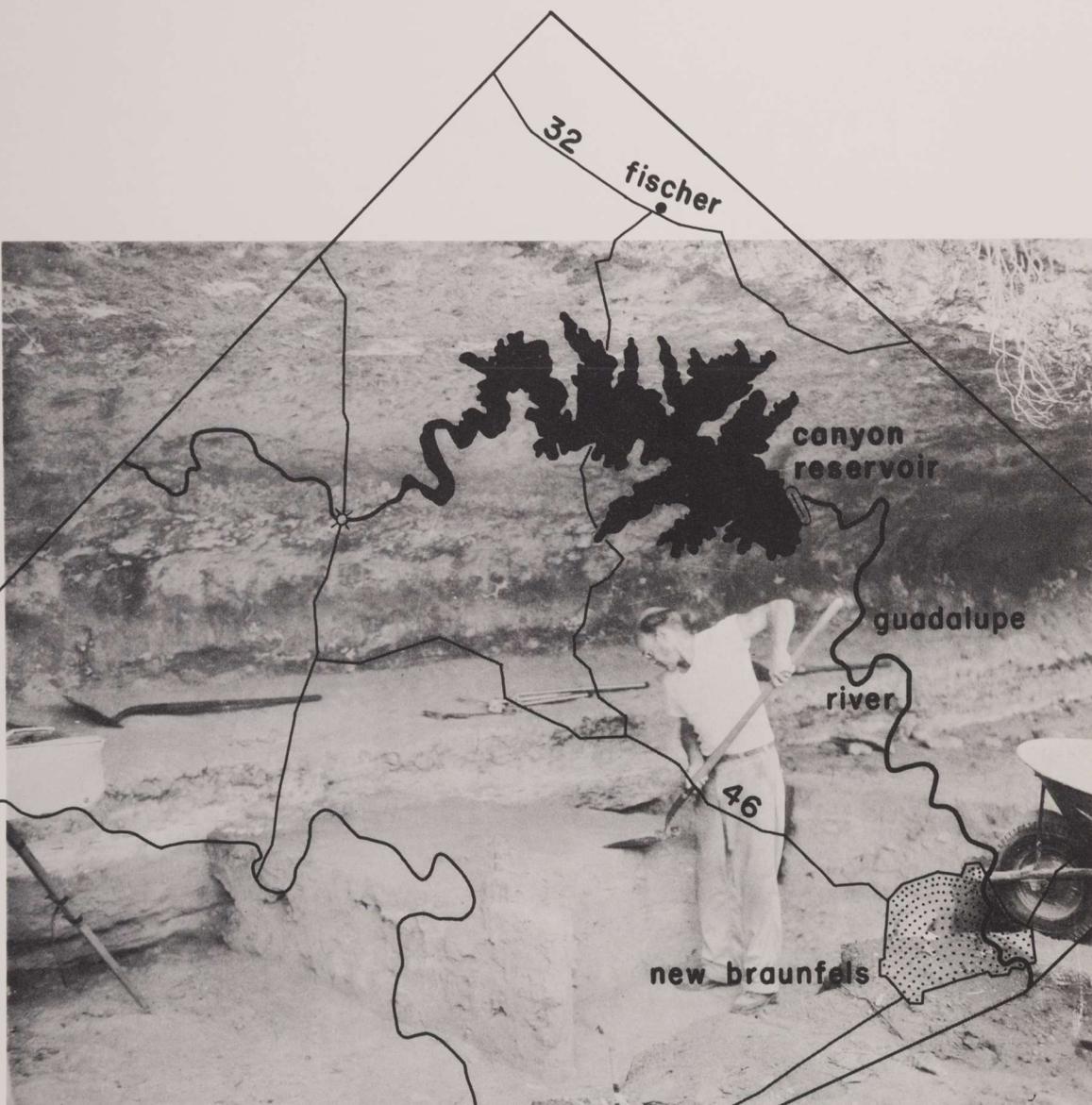


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Salvage Archeology of Canyon Reservoir: *The Wunderlich, Footbridge, and Oblate Sites*

LEROY JOHNSON, JR., DEE ANN SUHM, CURTIS D. TUNNELL

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LEROY JOHNSON, JR., DEE ANN SUHM, CURTIS D. TUNNELL

This report was prepared in accordance with two Memoranda of Agreement (Nos. 14-10-0333-528 and 14-10-0333-657) between The University of Texas and the National Park Service providing for salvage excavations in advance of construction at Canyon Reservoir, Texas.

TEXAS MEMORIAL MUSEUM

THE UNIVERSITY OF TEXAS

24th & Trinity · Austin 5, Texas

PREFACE

This report embodies the findings made through the excavation and analysis of three important Indian campsites in central Texas. The archeological significance of these sites stems, primarily, from their relatively discrete occupational components.

To be treated here are the Wunderlich Site (41CM3),* the Oblate Rockshelter (41CM1), and the Footbridge Site (41CM2), all located within that area of Comal County which will be affected by Canyon Dam and Reservoir (Fig. 1) upon their completion. Canyon Dam is presently being constructed 12 miles north-northwest of the city of New Braunfels. Completion of the reservoir—which is destined to aid in flood control and to serve as a recreation area—is tentatively scheduled for 1963. As early as 1949, however, plans for the reservoir had been approved. In August of that year Robert L. Stephenson (1951) of the River Basin Surveys, Smithsonian Institution, made a thorough reconnaissance of the reservoir area, locating and mapping numerous archeological sites which would be damaged or destroyed.

In the fall of 1959, when construction work was finally begun, the Texas Archeological Salvage Project (T.A.S.P.) of The University of Texas dispatched a field crew to the Canyon Reservoir area to begin salvage excavations. The recommendations made by Stephenson (1951), as well as the findings of more recent reconnoitering by the T.A.S.P., were used to select the most promising archeological sites for excavation. The Oblate Rockshelter was partially excavated that year under the provisions of Memorandum of Agreement 14-10-0333-528 between the National Park Service and The University of Texas. In the fall of 1960 (Memorandum of Agreement 14-10-0333-657) further work was done at Oblate by the T.A.S.P., and limited excavations were undertaken at the Wunderlich and Footbridge sites. All of this work was carried out as part of the Inter-Agency Archeological Salvage Pro-

* In this site designation system, 41 indicates the State of Texas, CM stands for Comal County, and 3 for the Wunderlich Site, the third site officially recorded in Comal County.

gram. This program co-ordinates the salvage of archeological and paleontological materials that are in danger of destruction by reservoir construction throughout the nation.

Excavation of the Oblate and Wunderlich sites was supervised by Curtis D. Tunnell. Dee Ann Suhm, assisted by Tunnell, supervised excavation of the Footbridge Site. All the work at Canyon was under the general direction of T. N. Campbell, Director of the T.A.S.P., and Edward B. Jelks, Executive-Director. The assistance and aid of numerous individuals in the field, in the laboratory analysis, and in matters of interpretation, are acknowledged in the pertinent sections of the individual site reports that follow.

The ideal procedure for interpreting and reporting the data recovered from these sites would have been for one individual to write all three site reports. This procedure, regrettably, could not be followed. Although Curtis Tunnell, the chief field archeologist, was able to complete the analysis of the Oblate Rockshelter, urgent duties elsewhere limited his studies to this one site. Dee Ann Suhm, Curator of Anthropology at the Texas Memorial Museum, reported on the Footbridge Site, while LeRoy Johnson, Jr., of the T.A.S.P., wrote the section dealing with the Wunderlich Site. Diverse duties in different geographic areas precluded any close collaboration between the three writers during preparation of the site reports. The following reports, each dealing with a separate site, therefore vary somewhat in mode of presentation, organization, and delineation of the descriptive artifact categories. The reader should bear in mind that each was written independently.

In addition to the three site reports, this paper includes an introductory section providing general background information, and a concluding section containing a synthesis of the data from the individual site reports. In this last section Suhm and Johnson collaborated, and it is their hope that the individual reports have been compared and synthesized in such a way as to provide a useful interpretation of the archeology of Canyon Reservoir.

ABSTRACT

Three multi-component Indian campsites in the Canyon Reservoir area, Comal County, Texas, were excavated in 1959 and 1960 by the Texas Archeological Salvage Project. The artifacts from these sites are described in detail. Intermittent occupations at the sites are attributed principally to the Archaic Edwards Plateau Aspect and, to a lesser extent, to the later Central Texas Aspect. Two of the sites, Wunderlich and Oblate, yielded data which permit a tentative sequential ordering of certain Edwards Plateau Aspect dart point types. These data, especially when compared with those from related central Texas sites, suggest that the Edwards Plateau Aspect can advantageously, but tentatively, be divided into four time periods: Early, Middle, Late, and Transitional Archaic. Brief comparison with other dart point sequences in Texas and northern Mexico indicates that Edwards Plateau Aspect dart points have close stylistic ties to the west.

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INTRODUCTION

The Area

Physiography

Canyon Dam and Reservoir will lie near the southeastern edge of the Edwards Plateau, a dominant feature of the Great Plains Physiographic Province (Fenneman, 1931: 50-54). The Edwards Plateau, a maturely eroded stratum plain, slopes gently from west to east. The western edge, along the Pecos River, has a surface elevation of about 4,000 feet above mean sea level, while the eastern edge averages about 1,000 feet in elevation. The Balcones

Escarpment forms the southern and eastern margins of the Edwards Plateau; from 300 to 1,000 feet of topographic relief mark this well defined fault line.

The Guadalupe River, a perennial stream, flows from its headwaters in Kerr County on the Edwards Plateau for about 432 miles in a southeasterly direction into San Antonio Bay, an estuary emptying into the Gulf of Mexico. Canyon Reservoir will be located in Comal County, along one of the most picturesque sections of the Guadalupe Valley. In this area the meandering river has become deeply entrenched in the Cretaceous limestone deposits and the resulting "hill country" stands in rugged contrast to the broad coastal plain farther downstream.

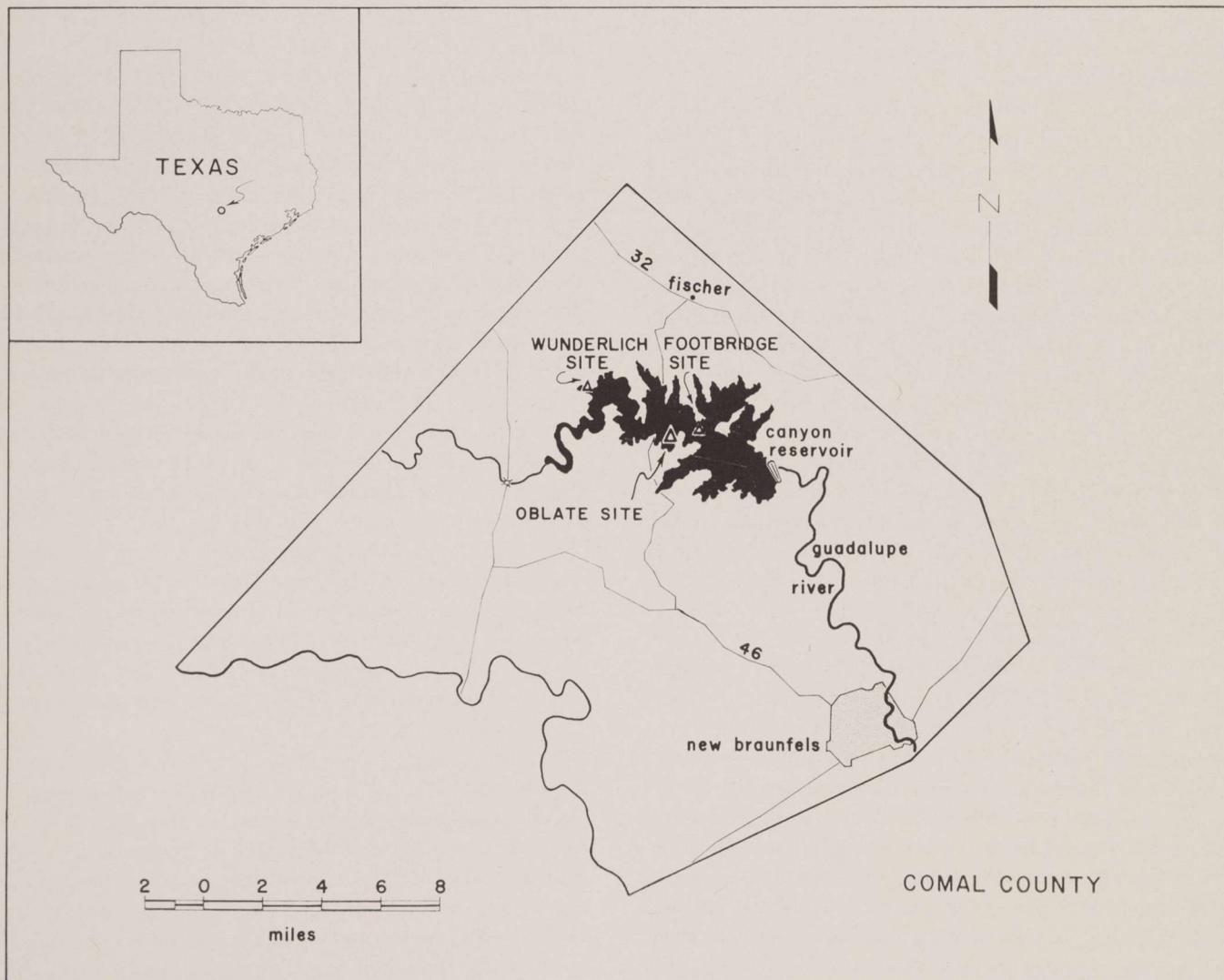


FIGURE 1.

Surface Geology

The surface geology in Comal County is dominated by thick limestone deposits of the Comanchean Series of the Cretaceous Epoch. Present in the Comanchean are formations of the Fredericksburg and Trinity groups (Sellards *et al.*, 1932: 272-278). Solution caverns and artesian springs, which occur commonly in these limestone formations, are well represented in Comal County. Remnants of stream terrace deposits of Pleistocene and Recent age also occur all along the Guadalupe River and its major tributaries.

Biota

The Edwards Plateau and the Llano Uplift area of Texas comprise the Balconian Biotic Province (Blair, 1950: 93-117). This small province, which has a distinctive flora, is characterized by a unique mixture of faunal elements from several larger biotic provinces. Comal County and Canyon Reservoir are situated in the southeastern portion of the Balconian Province.

The heavily eroded hills formed by the Guadalupe River and its tributaries in Comal County have irregular patches of poorly developed topsoil and therefore are unsuited to farming. These limestone hills, for the most part, are sparsely covered with various native grasses and scrub forests of Mexican juniper, Texas oak, stunted live oak, and mesquite. Along the stream valleys, on the other hand, fertile alluvial terrace deposits serve as excellent farmland and support substantial stands of large live oaks, elms, hackberries, pecans and cypress. Bear grass and prickly pear cactus, characteristic of the Chihuahuan Biotic Province, are occasionally found in Comal County.

The Balconian Biotic Province contains a large number of vertebrate species—57 species of mammals, one species of land turtle, 16 species of lizards, 36 species of snakes, 15 species of frogs and toads, and seven species of newts and salamanders. None of these forms is restricted to this province; most are also characteristic of one or more of the major biotic provinces to the east or west.

Along the rocky slopes of the hills, ringtail cats, rock squirrels, skunks, badgers, and various rodents are commonly found. At the present time deer are abundant in the timbered valleys, and raccoons, opossums, muskrats, armadillos, and flocks of wild turkeys are frequently encountered. Snakes of various kinds—coral snakes, rattlesnakes, and other species—are occasionally seen. The river channel is characterized by long outcrops of bare limestone into which the stream has cut numerous narrow, parallel flumes; schools of silvery minnows frequent these rapids, and occasionally the river flows into deep, still pools where fish and mollusks abound.

The Archeology

Background

Throughout all parts of central Texas there is abundant evidence of pre-European occupations. Most important of these are former campsites—sites distinguished principally by accumulations of domestic refuse. The campsites in central Texas typically occur near reliable, or once reliable, sources of water. They can, with considerable assurance, be identified with semi-nomadic hunting and gathering peoples. Features usually associated with sedentary groups, such as substantial house remains and earthworks, are absent.

The campsites are of several types, the distinction between these being, to a large extent, a matter of physiographic setting. One of the most common types, the burned-rock midden, is characterized by sizable concentrations of discarded hearthstones. Burned-rock middens are usually found in upland areas, or along small streams where the rate of soil deposition appears to have been relatively slow. Wunderlich is one of these sites.

A second type of campsite consists of occupational debris buried in alluvial terraces. The Footbridge Site fits this category. Primarily because of the relatively rapid rate of soil deposition, terrace sites often offer good opportunities for finding well stratified cultural remains.

Another major type of campsite is that found in rock-shelters. These are common in central Texas, especially along the margins of stream valleys where massive limestone formations have been exposed through erosion. In some cases, such as at the Oblate Site, the occupational debris of a rockshelter extends out onto an adjacent terrace.

In very broad terms the archeology of central Texas (and other parts of the state) can be viewed in terms of four major developments or stages. These are (from early to late) :

1) *The Paleo-Indian Stage.* The earliest yet recognized, this stage is characterized by a dependency upon large, extinct (Pleistocene) game animals, especially mammoth and bison. The most diagnostic artifacts are expertly chipped, generally lanceolate dart points of several distinctive types. Paleo sites are known in central Texas, but are rare.

2) *The Archaic Stage.* With the gradual extinction of the Pleistocene fauna numerous, usually small, groups of hunting-gathering peoples occupied central Texas. Much better known than the Paleo-Indian Stage, the Archaic is distinguished by a greater diversity in tool types (which are usually less carefully manufactured than those of the Paleo-Indian Stage) and by concrete evidence of regional cultural diversification. Archeologically, this is by far the best represented stage in central Texas.

3) *The Neo-American Stage.* Technological innovations—particularly agriculture, pottery, and the bow and arrow—mark this stage. The regional developments noted in the Archaic Stage continued and became even more pronounced. In central Texas, however, the Neo-American Stage was never fully manifested, and hunting and food collecting continued to be the main sources of livelihood. The most obvious Neo-American traits which spread into the area are the bow and arrow and, to a more limited extent, pottery.

4) *The Historic Stage.* This stage marks the arrival of Europeans; hence the most diagnostic artifacts are of non-Indian manufacture. It embraces the gradual decline of Indian culture and the corresponding rise of European culture. Historic sites have been reported in central Texas, but few have been systematically investigated.

Turning specifically to the Canyon Reservoir area, the major occupations at the three sites excavated can be attributed to the Archaic Stage. Significant remains of the Neo-American Stage were found only at the Oblate Site, while both Oblate and Footbridge yielded some historic materials, most of which can be assigned to recent non-Indian occupations. None of the three contained Paleo-Indian components, although at least one dart point of Paleo type was found at each of the sites.

Previous Work

Prior to the field work undertaken in 1959 and 1960 by the Texas Archeological Salvage Project, no systematic excavations had been made in the Canyon Reservoir area. In fact, previous archeological investigations of any sort in Comal County were limited to Stephenson's preliminary survey of the reservoir in 1949.

Interpretation

As central Texas archeology is presently understood, it consists of various cultural units whose temporal and compositional limits are only sketchily delimited. J. Charles Kelley (1947a, 1947b, 1948, 1959)—following, and utilizing to some extent, the pioneer efforts of J. E. Pearce (1932), Cyrus N. Ray (1938, 1948), E. B. Sayles (1935), and Vane Huskey (1935)—set up an Archaic Edwards Plateau Aspect and a later (Neo-American) Central Texas Aspect, each with several named foci. Since a comprehensive summary of the historical developments of archeology in central Texas area has recently been published by Suhm (1960), all the particulars need not be repeated here. For the most part, however, the basic taxonomy has remained much as Kelley defined it more than a decade ago.

It should be kept in mind, however, that Kelley's foci

are not precise cultural units. Rather, they are provisional groupings of a very small number of artifact classes and types which Kelley thought occurred more or less consistently together. By Kelley's classification, the Edwards Plateau Aspect includes the Round Rock, Clear Fork, and Uvalde foci, while the Central Texas Aspect embraces the Austin and Toyah foci.

The Central Texas Aspect need not concern us here particularly, since only a few of its artifacts were recovered from the excavations at Canyon Reservoir. Moreover, a comprehensive analysis of the Central Texas Aspect—including discussions of age and definition of foci—has recently been completed by Edward B. Jelks (1962). Suffice it to say that the most diagnostic element of the earlier Austin Focus is the *Scallorn* arrow point type, while the later Toyah Focus is distinguished by the *Perdiz* arrow point type.

For the Round Rock Focus, the following traits are enumerated (Kelley, 1947a, 1947b): (1) flat, notched pebbles, (2) "spike-like" blades, and (3) dart point types *Pedernales*, *Castroville*, and *Strawn Stemmed*. The Clear Fork Focus contains (1) the Clear Fork gouge, and (2) dart point types *Nolan*, *Baird Beveled Blade*, and *Taylor Thinned Base*. The Uvalde Focus is characterized by (1) shaft-straighteners, and (2) *Frio*, *Montell*, and *Smithwick Small Stem* dart points. In each case the dart points are considered to be the major diagnostics, no attempt having been made to provide a full definition of any of the three foci.

The relative dating of Kelley's foci of the Edwards Plateau Aspect has never been determined satisfactorily. Basing his decision primarily upon information obtained from several sites in the Colorado River system, Kelley (1947b) concluded that the Clear Fork and Round Rock were contemporaneous, with probable concentrations of the latter to the south and the former to the north. The Uvalde Focus, by contrast, was initially recognized as appearing somewhat later and as replacing locally, particularly in west-central Texas, earlier phases of the Edwards Plateau Aspect (Kelley, 1947a, 1948, 1959). Thus, with the partial exception of the Uvalde Focus, these divisions were defined on the strength of geographic differences in the distribution of selected dart point types.

Subsequent researchers concerned with the Edwards Plateau Aspect have, in general, concurred with Kelley's *relative dating*. Some (Suhm *et al.*, 1954; Suhm, 1955) even argued—since the diagnostic artifacts (as defined by Kelley) of all three foci were commonly found together in apparent association—that a division into foci was not, at the time, practical.

As a result of the analysis embodied in the following reports, a stratigraphic differentiation in the occurrence of several artifact styles—primarily dart point types—

was determined to exist at Wunderlich and Oblate. At the Footbridge Site, however, no meaningful differentiation in the vertical distribution of these types was discernible, perhaps due to physical mixing of the deposits.

The stratigraphic information obtained at Canyon Reservoir, along with comparable data from related archeological sites to be mentioned in the concluding section, suggest strongly that certain adjustments need to be made in our general picture of central Texas prehistory:

1) Most importantly, we can now recognize the temporal significance of stylistic changes in some of the Edwards Plateau Aspect dart points.

2) Although we are unable, at this time, to organize our data into valid culture complexes, we do not deny that these *may*

exist. We simply note that any evidence which could link the temporal changes in dart point styles to discrete cultural groups—archeological foci—is lacking.

We therefore propose to utilize in our study constructs which are as near to the empirical data as possible. These include the correlation of certain projectile point forms with relative time periods and the tracing of certain stylistic trends through time and space.

Lastly, it should be noted that this paper will have a principally historical or chronological bent, and that it will consequently devote little attention to ecological, functional, and sociological problems. While the latter problems are considered to be as significant as the former, the nature of the sites, coupled with the urgent need for the chronological ordering of Archaic materials in central Texas, have led to an emphasis on sequence.



WUNDERLICH: A BURNED-ROCK MIDDEN SITE

LEROY JOHNSON, JR.

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INTRODUCTION

The Wunderlich Site (41CM3) is an open occupation site located on a low alluvial terrace of Rebecca Creek. This stream is one of the minor tributaries of the Guadalupe River, and is situated at the western end of Canyon Reservoir about 20 miles northwest of the city of New Braunfels (Fig. 1). The site is located approximately 4,000 feet west of the confluence of Rebecca Creek and the

Guadalupe, on the land of Mrs. Pauline Wunderlich.

Limited excavations were carried on at the site from September 30, to October 14, 1960. The actual field excavation at the Wunderlich Site was supervised by archeologist Curtis D. Tunnell and assistants Kenneth H. Honea, Jacob Bergolofsky, David L. Dean, Robert C. Hoover, Horace W. Johnson, and James B. Swayze.

ACKNOWLEDGMENTS

The writer wishes to express his sincere appreciation to T. N. Campbell, Edward B. Jelks, Dee Ann Suhm, and Curtis D. Tunnell, all of whom gave freely of their rich store of information on the archeology of central Texas. These archeologists aided the writer in problems of general interpretation, typology, taxonomy, etc., and were a

constant source of encouragement. Nevertheless, the conclusions reached in this report are those of the writer, and his is the responsibility for any errors in interpretation. Additional thanks are due T. N. Campbell for his editorial assistance.

DESCRIPTION OF THE SITE

Situation

The Wunderlich Site consists of two burned-rock middens located on a low bench or terrace of alluvium on the northern side of Rebecca Creek (Fig. 2). The terrace is approximately 90 feet wide, is bounded on the north by relatively high limestone cliffs, and on the south by the flood plain of Rebecca Creek. The creek itself is situated about 100 feet south of the edge of the terrace.

The distance between the two middens is 140 feet. Midden A (to the east) and Midden B (to the west) represent the only marked concentrations of burned rock and other occupation detritus in the immediate area, although sparsely scattered artifacts can be found in the general vicinity, and in the area separating the two middens. The middens were both in the neighborhood of 30 feet in diameter.

Internal Structure

Midden A, which was observed eroding from the edge of the terrace, consisted of the following strata revealed by excavation (Fig. 3, Area A) :

Zone A was a basal soil of light tan, compact, clayey sand which contained very little cultural material; it was encountered at an average depth of 3.5 feet below the surface and extended downward to an undetermined depth.

Zone B was a zone of compact, light gray sand which contained a considerable amount of cultural debris; the average thickness of this zone was 1.5 feet, and it was encountered at an average depth of 2 feet below the surface.

Zone C, the main occupation zone, contained an abundance of dark gray-black midden soil, burned limestone fragments, animal bones, and a few mussel and snail shells. The average thickness of Zone C was 1 foot, and it was

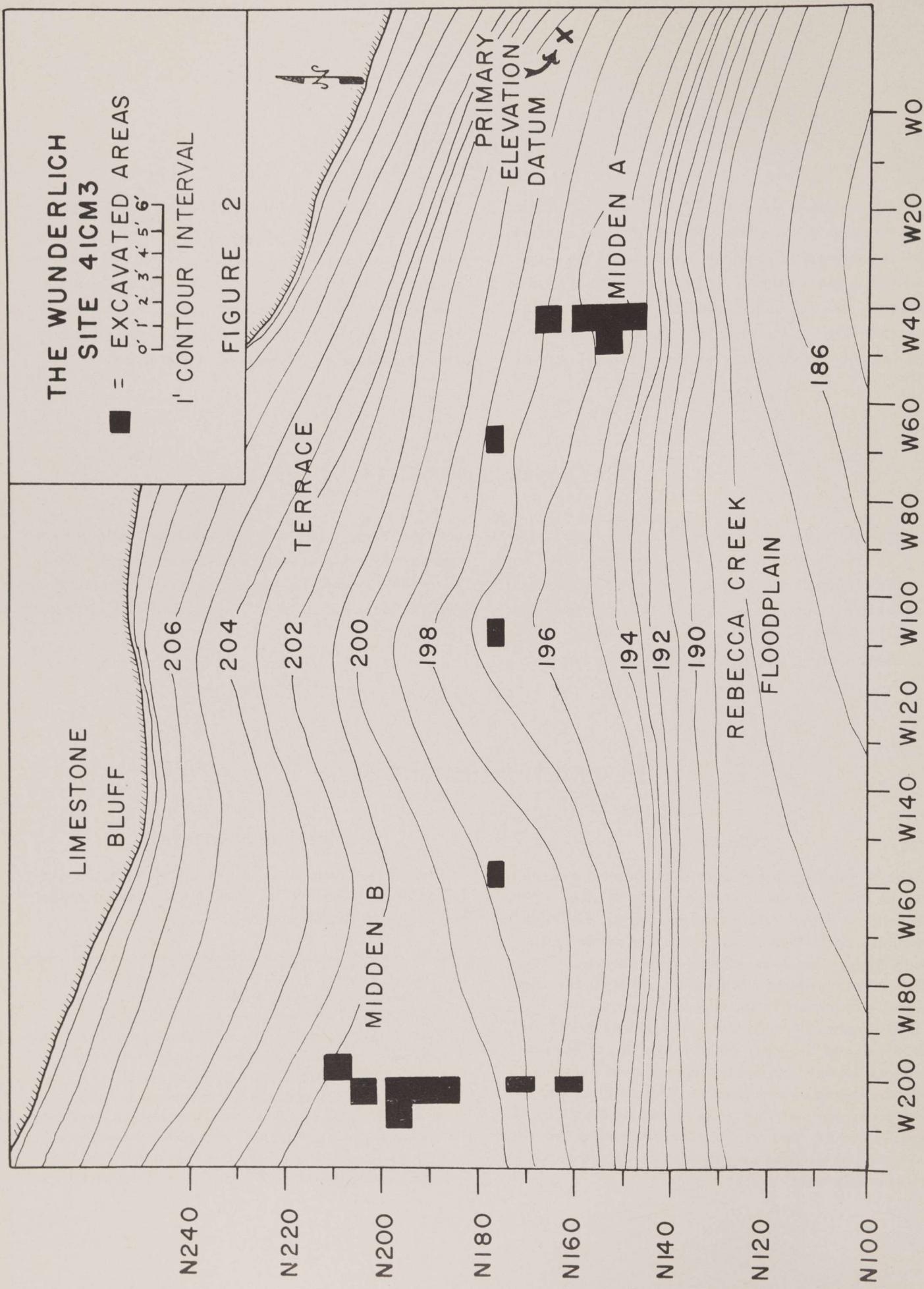


FIGURE 2.

encountered at an average depth of 1 foot below the surface.

Zone D, the surface zone, consisted of dark brown, friable midden sand with very little burned rock. Cultural debris was relatively abundant. The average thickness of Zone D was 1 foot.

Midden B, 140 feet to the west of Midden A and 35 feet back from the edge of the terrace, was composed of the following strata (Fig. 3, Area B) :

Zone A was composed of a basal, tan-colored clay containing very few signs of human occupation; this zone was encountered at an average depth of 3.5 feet below the present surface and extended downward for an undetermined distance. It corresponds to Zone A of Midden A.

Zone B, consisting of a dark gray-brown midden sand, contained numerous burned rocks and a considerable amount of occupation debris. The average thickness of this stratum was 1 foot, and it was encountered at a depth of 2.5 feet below the surface.

Zone C was a local lenticular stratum of light gray sand and ash containing cultural refuse. It was approximately .7 foot thick in the center, but pinched out both to the north and to the south. Its maximum extent as seen in north-south

profile measured 11 feet. Zone C was encountered at an average depth of 1.8 feet below the surface.

Zone D was another local lens consisting of dark gray midden soil, a few burned rocks, and some occupation debris. This stratum had an average thickness of about .7 foot, although it varied considerably. It was encountered at an average depth of 1.1 feet below the surface and was of local extent, measuring 14 feet in maximum length as seen in north-south profile. The limited areal extent of zones C and D, in addition to their lenticular shapes, suggest that these two strata were built up by a comparatively small group of people who employed a very limited area for cooking purposes.

Zone E, the surface stratum of Midden B, was composed of a dark gray-brown midden soil with numerous burned rocks, abundant artifacts, and other occupation remains. This zone attained an average depth of 1.1 feet below the surface.

Geologically speaking, the only zones which are comparable in the two middens are the two zones A. The upper strata of each midden are local in extent, and those from Midden A do not correspond, in composition, to those of Midden B. This is due, it seems, to the fact that each midden is a separate and discrete occupation area.

EXCAVATION OF THE SITE

To initiate work at the Wunderlich Site, a primary elevation control point was established on a flat limestone boulder to the east of Midden A (Fig. 2). This was assigned an arbitrary elevation of 200 feet, and a contour map was made for the site using this datum as reference. Unfortunately, no U. S. G. S. bench mark could be located in the immediate area and it was not therefore feasible to relate the arbitrary site elevations to mean sea level.

A grid system, oriented on magnetic north and using 5-foot squares as excavation units, was imposed over the site (Fig. 2). A horizontal reference or control point was set up near the creek to the east of Midden A, which was designated NO-WO, and all points on the site were measured from this datum. As an illustration, stake N200-W250 was located 200 feet north and 250 feet west of the horizontal control point; the 5-foot square with that stake at its southeastern corner was labeled square N200-W250.

To seek any occupational features which might be present and to determine the stratigraphic composition of the site, various 5-foot squares were put down—generally in a north-south line—through Middens A and B, and several additional test excavations were made at other parts of the site (consult Fig. 2 for their exact locations).

In Midden A four squares were excavated along the

W45 line, resulting in a short cross section of that midden which reached from stake N145 to N167 (Fig. 2). Square N155-W40 was also excavated with this group.

In Midden B five squares were excavated along the W200 line, reaching from stake N185 to N212, and two 2.5 by 5-foot squares were also put down to the south of this group: squares N175-W200 and N165-W200.

In addition to the excavations carried on in the two midden areas, three small test pits were sunk in the 140 foot area lying between the middens (Fig. 2). These excavations, disappointingly, produced very limited returns.

The digging was done in arbitrary half-foot intervals and the artifacts recovered were bagged according to their respective levels. All of the soil in both midden areas was passed through screens having a half-inch mesh, and the “floors” of all the half-foot levels were carefully troweled to facilitate the detection of features. Only in the case of the three small test squares lying between the two middens was the soil not screened.

The excavations in Midden A did not exceed a depth of 5 feet below the surface; those in Midden B did not go beyond a depth of 4.5 feet.

Disappointingly, no occupational features of any sort—burials, hearths, etc.—were detected during the course of the field investigations.

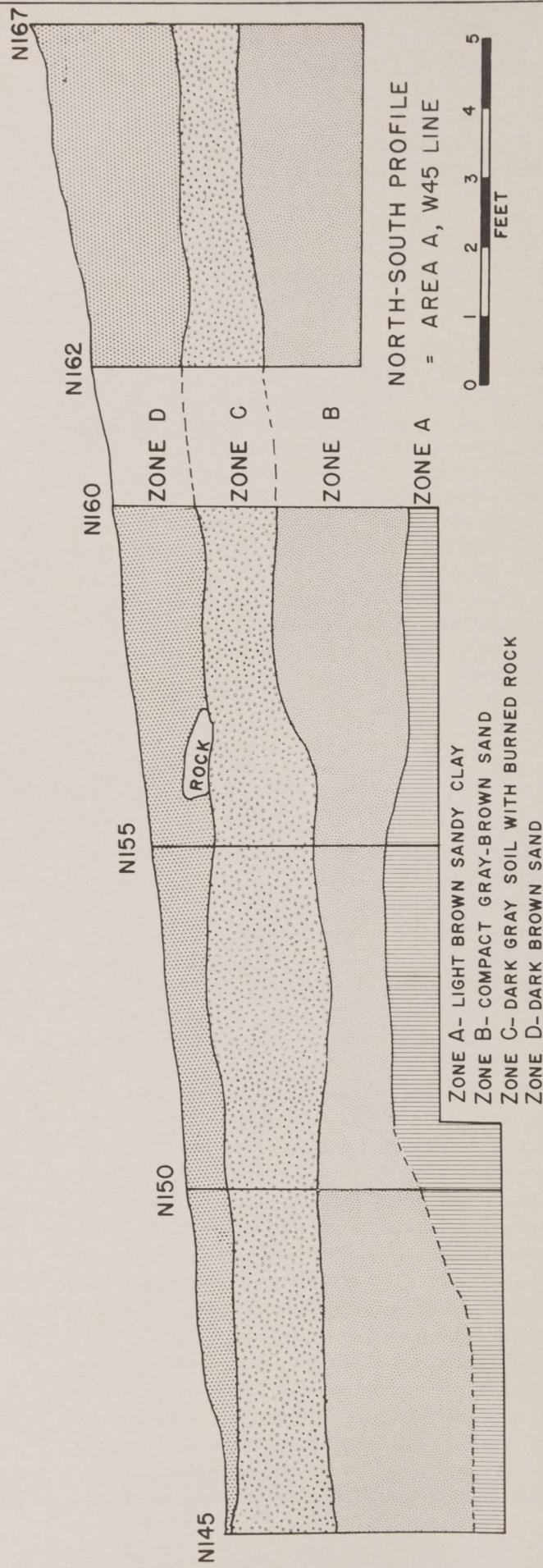
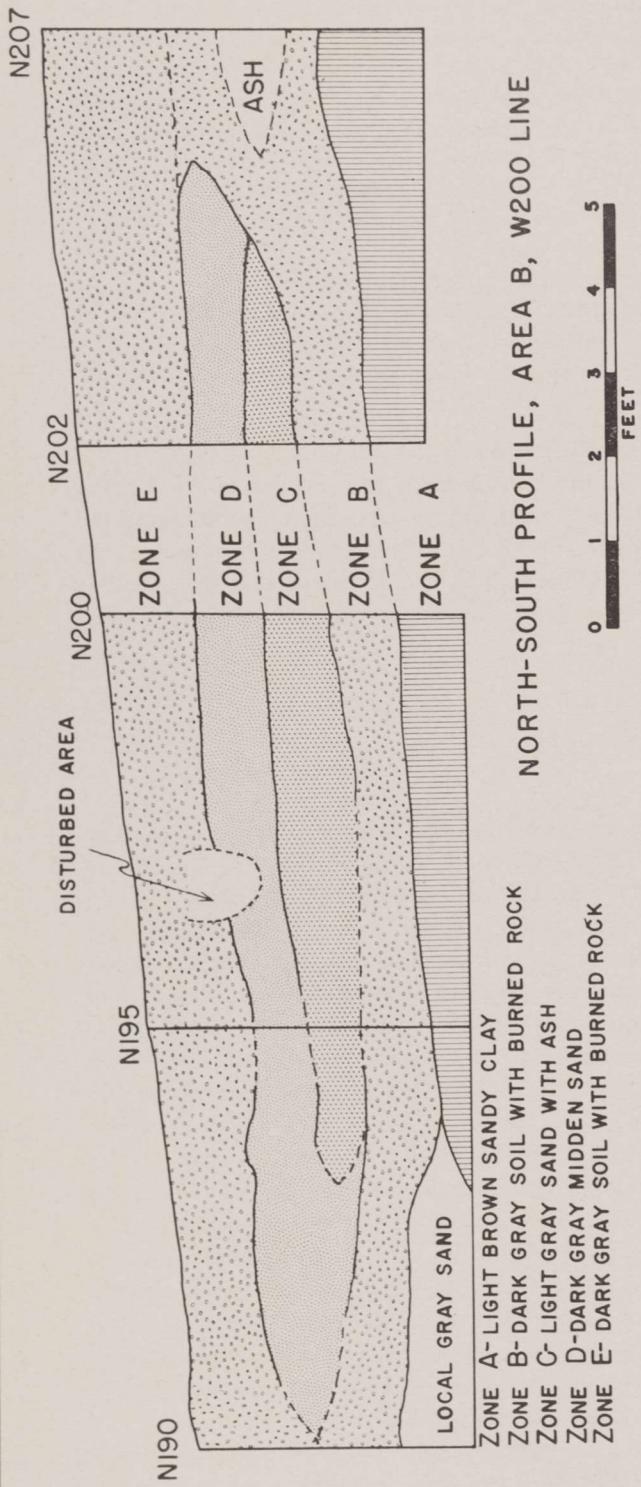


FIGURE 3, THE WUNDERLICH SITE

THE ARTIFACTS

Three hundred fifty-five artifacts were recovered from the surface and from excavations at the Wunderlich Site. These man-made items include only lithic and organic materials of the most durable sort, as is frequently the case with materials obtained from exposed sites. Such open occupation areas rarely yield basketry, wooden artifacts, or other perishable items. However, judging from rockshelters and caves which have rendered perishables as well as lithic assemblages similar to that from Wunderlich, we feel entirely justified in assuming that the peoples responsible for the various occupations at Wunderlich were not without basketry, footwear, leather goods, and other less durable trappings and accouterments.

In presenting the following artifact descriptions, it was decided to follow a classification by use-classes insofar as these could be determined. This procedure was adopted in lieu of delineating categories by means of the types of technology employed in artifact manufacture (core tools, initial flake tools, and so forth), as is the procedure commonly employed by some archeological writers. Rather, in the present paper, appropriate comments concerning manufacture and technology will be included under the various use-appellations in those instances in which such observations can be made with some degree of certainty.

Projectile Points

Twenty-five discrete styles of dart points were recognized at Wunderlich. In contrast, only four arrow point types were present. The dart points, which include some highly fragmented specimens, numbered 179, while 12 arrow points were found.

Dart Points

The presentation of the dart point types will be according to alphabetical arrangement, with the several varieties following their respective types.

The varieties that are set up herein for *Pedernales*, *Bulverde*, and *Ensor* will not be named but will merely be assigned numbers. This course of action was decided upon because the historical significance of these groupings is not yet demonstrated by means of adequate comparative and distributional data.

Also, several distinctive groupings of dart points were recognized which seemed to represent types, but for which no named categories exist. These are called here *Provisional Types I through IV* and will not be named until adequate data pertaining to their areal and temporal distributions become available.

THE ARTIFACTS

ANGOSTURA (Fig. 9, A)

No. of specimens: 1

Form: The general outline is leaf-shaped with convex edges and a narrow, slightly concave base. The widest portion of the point is very close to the distal end, and gives the impression that the tip may have been broken and reshaped. The blade edges have been ground slightly above the base.

Dimensions: Length: 59 mm. Width: 27 mm. Thickness: 8 mm.

Weight: 13.9 gm.

Workmanship: Good; long, transverse percussion flakes on the faces, and smaller pressure flaking or *retouche* along the edges.

Material: Local gray chert.

Provenience: Midden A.

Remarks: This specimen fits the type description given by Suhm, Krieger, and Jelks (1954: 402, Pl. 80), and seems a fairly representative example of the Paleo-Indian projectile point tradition.

BULVERDE (Fig. 6, A-E)

Twelve dart points, belonging to two distinct varieties, were assigned to the *Bulverde* type.

Bulverde, Variety 1 (Fig. 6, A-C)

No. of specimens: 9

Form: The blade is triangular with straight to slightly convex edges. The shoulders are prominent and are characterized by short barbs. The comparatively wide stem gives a general rectangular impression in spite of the fact that the edges contract very slightly at the base. The base is straight, and usually has slightly rounded corners.

Dimensions: Overall length: average, 59 mm.; range of variation, 48 to 68 mm. Width at the shoulders: average, 32 mm.; range, 26 to 40 mm. Thickness: average, 7 mm.; range 6 to 8 mm.

Weight: Average, 11.6 gm.; range of variation, 8.5 to 14.7 gm. Workmanship: Fair, percussion flaking much in evidence, with pressure flaking along the edges of the blade and stem.

Material: Gray to brown chert and black flint.

Provenience: Midden A (6), random surface (3).

Remarks: The most characteristic attributes of the Variety 1 *Bulverde* points from the Wunderlich Site are (1) a triangular blade and (2) a short, relatively wide, rectangular stem.

Bulverde, Variety 2 (Fig. 6, D, E)

No. of specimens: 3

Form: The blade is long and triangular, and although the edges tend to be straight, they vary between slightly concave and slightly convex. The shoulders are prominent but lack barbs. The stem is narrow, rectangular, has straight sides and a relatively straight base.

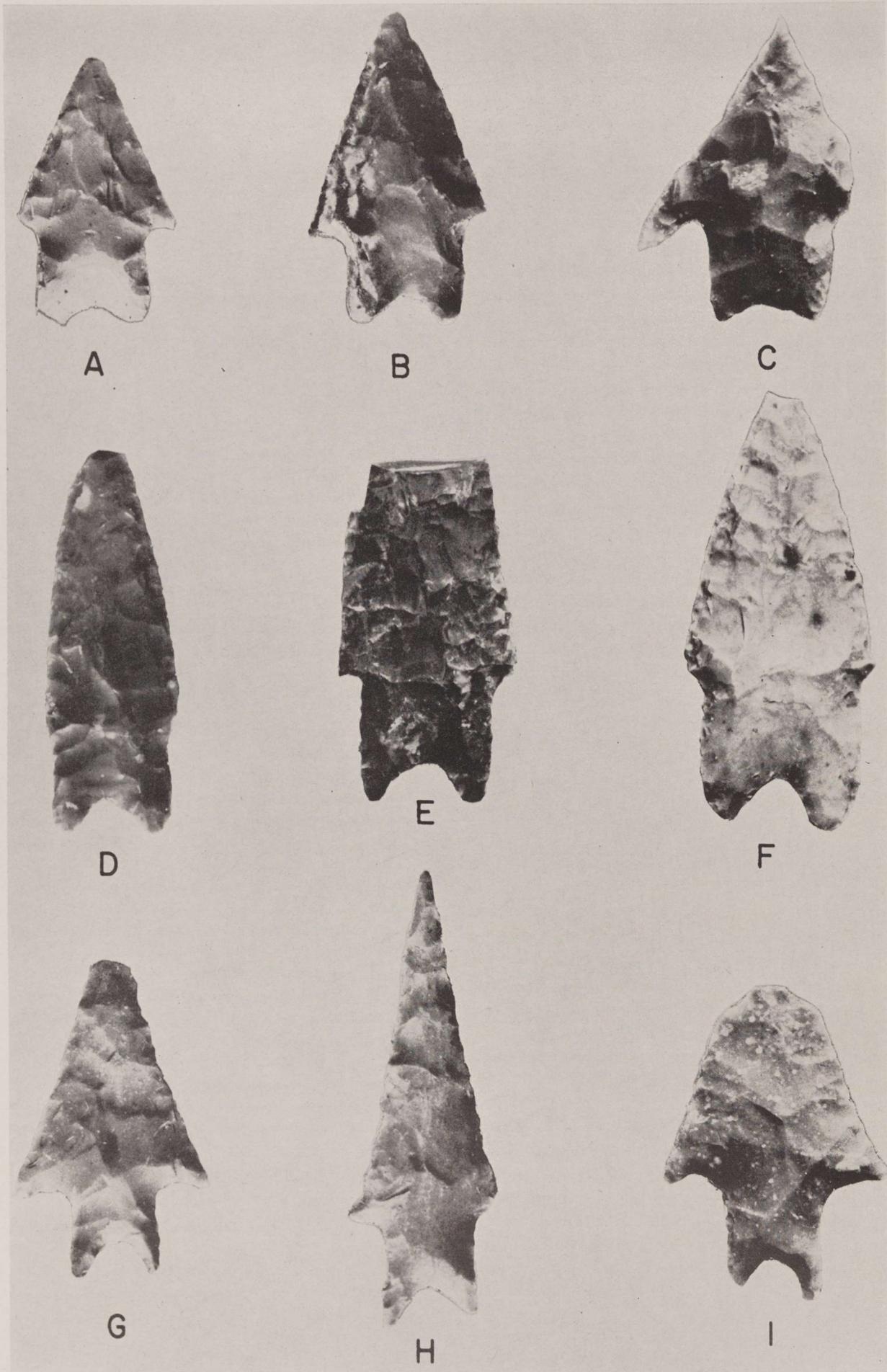


FIGURE 4. Pedernales Dart Points. A-C, Variety 1. D-F, Variety 2. G-I, Variety 3. All specimens natural size.

Dimensions: Overall length: specimen 1, 71 mm.; specimen 2, 66 mm.; specimen 3, 51 mm. Width at shoulders: specimen 1, 27 mm.; specimen 2, 23 mm.; specimen 3, 29 mm. Thickness: specimen 1, 8 mm.; specimen 2, 9 mm.; specimen 3, 8 mm.

Weight: Specimen 1, 13.4 gm.; specimen 2, 10.5 gm.; specimen 3, 10.1 gm.

Workmanship: Rather crude; flakes appear to have been removed by percussion flaking. Although some pressure flaking is in evidence on the edges, it is of a very poor quality.

Material: Gray chert.

Provenience: Midden A (2), Midden B (1).

Remarks: The Variety 2 specimens are characterized by (1) their long blades and (2) long, relatively narrow stems. These attributes serve to distinguish them from Variety 1. *Morrill* points resemble the Variety 2 specimens somewhat, but are much thicker and have appreciably longer stems.

CASTROVILLE (Fig. 7, K, L)

No. of specimens: 3

Form: These three specimens are fragmentary, lacking the greater part of their blades, hence complete descriptions cannot be given. The typical *Castroville* stem and barbs, however, are evidenced. The barbs are long and blunt while the stem is very wide, has straight sides, and a slightly convex base.

Dimensions: Most of the usual measurements could not be taken because of the fragmentary nature of the projectile points. The stems, however, measure 27, 26, and 24 mm. wide, respectively.

Weight: Undeterminable.

Workmanship: Fair, with large, wide flakes removed by percussion; some pressure flaking on the edges.

Material: Local gray cherts.

Provenience: Midden A (2), miscellaneous test squares (1).

Remarks: The diagnostic characteristics are (1) the triangular blade, (2) long, blunt barbs, and (3) the expanding, straight-sided stem with (4) slightly convex base.

CATÁN (Fig. 9, D)

No. of specimens: 1

Form: Subtriangular overall outline with convex edges and base.

Dimensions: Length, 32 mm.; width, 26 mm.; thickness, 4 mm.

Weight: 3.1 gm.

Workmanship: Crude secondary pressure flaking on the edges.

Material: Local gray chert.

Provenience: Midden B (1).

Remarks: The *Catán* point was first defined by Suhm, Krieger, and Jelks (1954: 410, Pl. 84). Its subtriangular outline and medium size are its most definitive attributes.

ENSOR (Fig. 7, E-H)

Ten dart points belonging to two varieties have been grouped under the *Ensor* heading.

Ensor, Variety 1 (Fig. 7, E, F)

No. of specimens: 4

Form: The typical blade is triangular, shouldered, and has short, rudimentary barbs. The stem is sharply expanding, and was produced by side or corner notching. The base is straight, slightly concave, or very slightly convex.

Dimensions: Overall length: average, 27 mm.; range of variation, 24 to 33 mm. Width at the base (the widest point on the specimens): average, 25 mm.; range, 20 to 33 mm. Thickness: average, 5 mm.; range, 5 to 6 mm.

Weight: 3.9 and 6.4 gm. (for the two complete specimens).

Workmanship: Fair, with rather crude pressure flaking on the edges of the blade and stem.

Material: Local gray chert.

Provenience: Midden A (1), Midden B (1), miscellaneous test squares (2).

Remarks: Only one of the Variety 1 dart points (Fig. 7, E) fits well the original definition of the type by Miller and Jelks (1952: 172, Pl. 22, panel 2). This specimen, and similar examples from Belton Reservoir (*ibid.*) have an expanding stem formed by corner notches, and are reminiscent of some *Ellis* specimens from eastern Texas. The other three specimens from Wunderlich, however, fall within the limits of the later definition of the type given by Suhm, Krieger, and Jelks (1954: 422, Pl. 90), which allows for the inclusion of specimens with deep side notches located just above the base. It is quite possible that with a larger sample it would be advantageous to separate the corner-notched from the side-notched specimens, and to place them under separate variety headings. Variety 1 at the Wunderlich Site corresponds to Tunnell's Variety A at Oblate (see p. 88).

ENSOR, Variety 2 (Fig. 7, G, H)

No. of specimens: 6

Form: These specimens fit the form description for Variety 1 with one notable exception—Variety 2 specimens have a conspicuous V-shaped notch midway on their bases.

Dimensions: Overall length: average, 38 mm.; range of variation, 27 to 50 mm. Width at the base (the widest part of the point): average, 26 mm.; range, 21 to 40 mm. Thickness: average, 5.5 mm.; range 5 to 6 mm.

Weight: Average, 8.1 gm.; range of variation, 2.4 to 10.6 gm.

Workmanship: Fair, but with somewhat careless pressure flaking on the edges.

Material: Tan and gray cherts of presumably local derivation.

Provenience: Midden A(2), random surface (3), miscellaneous test squares (1).

Remarks: The inclusion of Variety 2—the basally notched points—within the *Ensor* type constitutes a definite, but not major, expansion of the type definition. Should provenience data not support this proposed close relationship between the two varieties, Variety 2 may have to be set up as a separate type. Variety 2 might conceivably be considered as a variety of the *Frio* type. However, the base is not truly divided or bifurcate as in the case of *Frio*. The base of the Variety 2 specimens merely exhibits a small notch, and not a basal concavity as does *Frio*. Variety 2 at the Wunderlich Site corresponds to Tunnell's Variety B at Oblate (see p. 88).

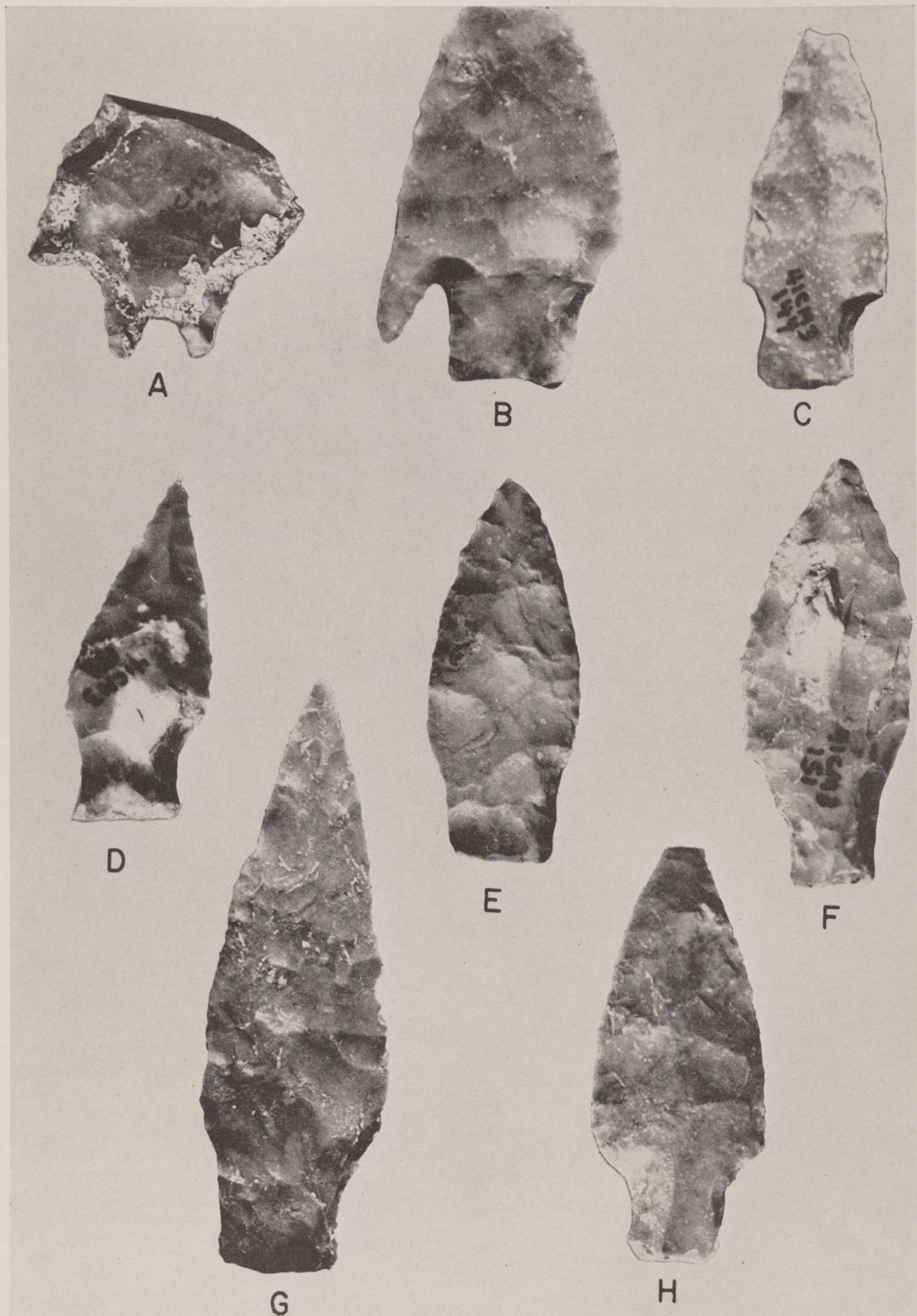


FIGURE 5. Dart Points. A, B, Miscellaneous Pedernales. C-F, Nolan. G, H, Travis. All specimens natural size.

FRIÖ (Fig. 7, I)

No. of specimens: 2

Form: The blade is triangular or subtriangular, with straight or nearly straight edges. The shoulders have sharp, but short, barbs. The stem expands strongly and was formed by deep corner notches. The base was originally convex, but has been divided in two by a rather large basal notch.

Dimensions: Overall length: specimen 1, 52 mm. (estimate); specimen 2, 45 mm. Width at the shoulders: specimen 1, 33 mm.; specimen 2, 26 mm. Thickness: specimen 1, 5 mm.; specimen 2, 7 mm.

Weight: Specimen 1, 9.6 gm.; specimen 2, 6.2 gm.

Workmanship: Fair, but with rather crude pressure flaking on the edges.

Material: Local tan chert.

Provenience: Midden A (1), random surface (1).

Remarks: The most important attributes of the *Friö* type are (1) its triangular blade and (2) bifurcate, expanding base.

KINNEY (Fig. 9, G, H)

No. of specimens: 2

Form: The general outline is leaf-shaped, while the edges are convex and contract very slightly at the base. The base itself is markedly concave and has been thinned by the removal of flakes from both faces.

Dimensions: Overall length: specimen 1, 50 mm.; specimen 2, 75 mm. (estimate). Width at the base: specimen 1, 28 mm.; specimen 2, 32 mm. Thickness: specimen 1, 6 mm.; specimen 2, 5 mm.

Weight: Specimen 1, 8 gm.; specimen 2, 12.3 gm.

Workmanship: Quite good; these specimens are very thin and well made, and were perhaps worked by the billet technique. Pressure flaking was employed on the edges of the base and blade.

Material: Gray chert (specimen 2) and agate (specimen 1).

Provenience: Midden A (1), miscellaneous test squares (1).

Remarks: The most diagnostic attributes of the *Kinney* type are (1) the leaf-shaped blade and (2) the thinned, concave base.

LANGE (Fig. 8, C)

No. of specimens: 2

Form: The blades are approximately triangular in outline, although one specimen has convex edges. The shoulders are provided with barbs; the stem is very slightly expanding and has straight sides and base.

Dimensions: Overall length: specimen 1, 44 mm.; specimen 2, 57 mm. Width at the shoulders: specimen 1, 35 mm.; specimen 2, 38 mm. Thickness: specimens 1 and 2, 6 mm.

Weight: Specimen 1, 9 gm.; specimen 2, 12.6 gm.

Workmanship: Good; transverse percussion flake scars appear on both faces, with pressure flaking on the edges.

Material: Local gray chert.

Provenience: Midden A (1), Midden B (1).

Remarks: The *Lange* type was originally described by Suhm,

Krieger, and Jelks (1954: 436, Pl. 97). Its salient characteristics are (1) its short barbs, and (2) its very slightly expanding stem with (3) straight edges and base.

LANGTRY (Fig. 6, F-I)

No. of specimens: 9

Form: A great deal of variation occurs within the group of nine points which are described here. As far as possible the groups (A-F) previously established in the Amistad (Diablo) Reservoir area will be followed (see references under *Remarks*).

The blades on all complete specimens are triangular, with approximately straight edges. The shoulders are well developed, with very short, rudimentary barbs. The stems of two specimens (Fig. 6, F) are relatively straight-sided and have a slightly concave base. They seem to fit the *Langtry A* group of the Amistad area. Another specimen (Fig. 6, G) has a slightly expanding stem and flat base, and belongs to the *Langtry C* group. Two specimens (Fig. 6, H) exhibit the sharply contracting stem of the *Langtry D* group, and four have very slightly contracting stems (Fig. 6, I) and do not fall within any of the previously established categories.

Dimensions: Overall length: average, 54 mm.; range of variation, 50 to 61 mm. Width at shoulders: average, 28 mm.; range, 21 to 32 mm. Thickness: average, 6 mm.; range, 5 to 8 mm.

Weight: Average, 8 gm.; range of variation, 5.5 to 10.1 gm.

Workmanship: Good, careful secondary pressure flaking evidenced on edges of blade and stem.

Material: Tan to dark gray and dark brown chert presumably of local origin.

Provenience: Midden A (8), Midden B (1).

Remarks: The sample of *Langtry* points is too small to warrant their being described as different varieties, and it is deemed better to relate them, insofar as possible, to the several *Langtry* groups which have been established for the type in Amistad Reservoir (Graham and Davis, 1958: 16-18, Pl. 5; Epstein, 1960a: 39-41, Fig. 8). Viewing the group as a whole, the most salient characteristics of the *Langtry* points are (1) their triangular blade, (2) prominent shoulders, (3) long and generally contracting stems.

MONTELL (Fig. 8, A, B)

No. of specimens: 7

Form: The only two intact specimens have broad, subtriangular blades with edges which are concave near the tip and slightly convex near the shoulders, producing the typical "recurved" blade appearance. The shoulders show small, short barbs, while the stems are slightly expanding and divided by a deep, narrow, basal notch. This clear bifurcation of the stem is an easily recognizable and important feature of the type. The base itself appears to have been markedly convex before the notch was made.

Dimensions: Overall length (for the two complete specimens): 56 and 59 mm. Width at the shoulders: average, 37 mm.; range of variation, 35 to 41 mm. Thickness: average, 5 mm.; range, 4 to 6 mm.

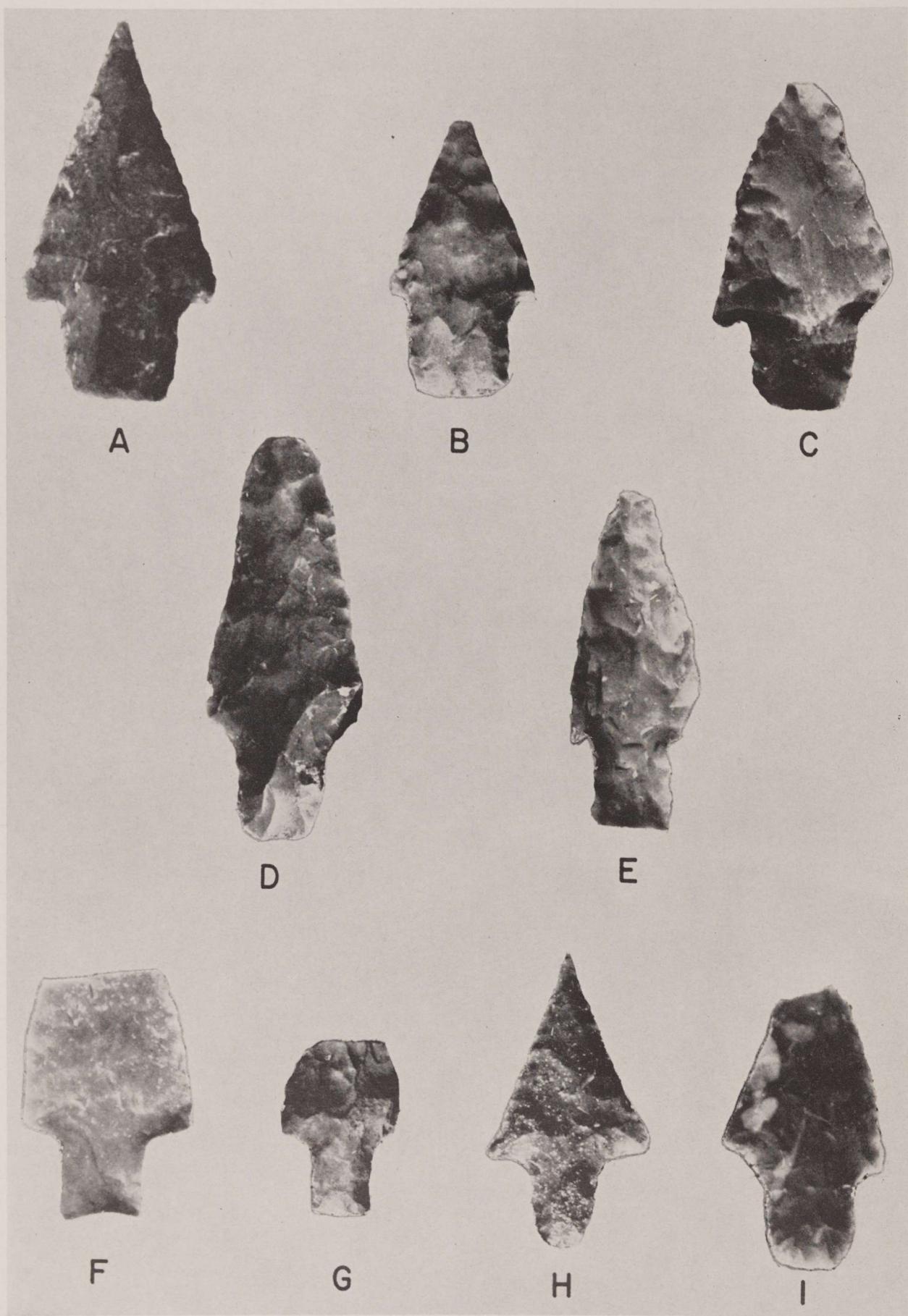


FIGURE 6. Dart Points. A-C, Bulverde, Variety 1. D, E, Bulverde, Variety 2. F-I, Langtry. All specimens natural size.

Weight: For the two complete specimens: 9.1 gm. and 10.6 gm.
Workmanship: Very good; the blades have been thinned by the removal of wide, flat flakes, perhaps by means of the billet percussion technique. The edges of the blade and stem show some evidence of secondary pressure flaking.

Material: Local gray and brown cherts.

Provenience: Midden A (2), Midden B (3), random surface (1), miscellaneous test squares (1).

Remarks: The Montell type (Kelley, 1947a: 124, Pl. 14, F; Suhm et al., 1954: 452, Pl. 105) is most easily recognized by its (1) bifurcate stem and (2) remarkably thin and well worked blade.

NOLAN (Fig. 5, C-F)

No. of specimens: 19

Form: The blade is generally lanceolate, with convex edges. The tips of three specimens are particularly sharp as a result of long, shallow concavities on the blade edges just below the tip. The shoulders are poorly developed, barbless, and rounded. The stem is most frequently slightly expanding near the base, and has gently concave edges and a straight or, less commonly, slightly convex base. The sides of the stem are alternately beveled, with the beveled edge located on the right edge when the point is oriented with the stem downward.

Dimensions: Overall length: average, 58 mm.; range of variation, 47 to 77 mm. Width midway on the blade: average, 27 mm.; range, 21 to 35 mm. Thickness: average, 9 mm.; range, 8 to 11 mm.

Weight: Average, 13.9 gm.; range of variation, 7.8 to 22.1 gm.

Workmanship: Fair; large flakes were removed, apparently by percussion flaking, although some specimens, in addition, show secondary pressure flaking on the edges.

Material: Light tan to gray-brown cherts presumably of local origin.

Provenience: Midden A (13), Midden B (1), random surface (5).

Remarks: The most diagnostic characteristics of the *Nolan* points at the Wunderlich Site are (1) a lanceolate blade, (2) rounded shoulders, and (3) alternately beveled stem.

PEDERNALES (Figs. 4; 5, A, B)

This dart point type includes 47 specimens which belong to the three varieties described below, as well as an additional 16 specimens that are included in a miscellaneous *Pedernales* group.

Pedernales, Variety 1 (Fig. 4, A-C)

No. of specimens: 16

Form: The blade is triangular with strong shoulders and well developed barbs; the stem usually has parallel sides but tends to contract slightly at the base. The base is deeply concave and was thinned by the removal of one or more flakes; those specimens which show the removal of one large flake from each face of the base resemble strongly in this respect the fluted points of the Paleo-Indian tradition.

Dimensions: Overall length: average, 55 mm.; range of variation, 48 to 64 mm. Width at the shoulders: average, 38 mm.; range, 29 to 52 mm. Thickness: average, 7 mm.; range, 5 to 9 mm.

Weight: Average, 11 gm.; range of variation, 7.9 to 13.1 gm.

Workmanship: Good, with secondary pressure flaking along the edges of both faces.

Material: Light tan to dark chert apparently of local origin.

Provenience: Midden A (7), Midden B (7), random surface (2).

Remarks: The diagnostic attributes of Variety 1 *Pedernales* are (1) its relatively great width, (2) triangular blade, and (3) well developed, but short barbs. Variety 1 resembles Tunnell's Variety B (found at Oblate), but is not identical in definition (see pp. 92-94).

Pedernales, Variety 2 (Fig. 4, D-F)

No. of specimens: 22

Form: The blade is lanceolate and has slightly convex edges, while the shoulders are prominent but lack true barbs. The sides of the stem are parallel and straight near the shoulders, but the stem contracts slightly at the base. The base is deeply concave (more so than in the case of Variety 1) and has rounded corners. Although these specimens show some basal thinning, the single-flake fluting found on some Variety 1 points is much less prominent on the Variety 2 specimens.

Dimensions: Overall length: average, 66 mm.; range of variation, 53 to 78 mm. Width at the shoulders: average, 30 mm.; range of variation, 24 to 34 mm. Thickness: average, 8 mm.; range, 6 to 10 mm.

Weight: Average, 13.2 gm.; range of variation, 9 to 22.5 gm.

Workmanship: Good, with many specimens showing long parallel flakes which extend from the blade edge to the center of the artifact. Secondary pressure flaking can be distinguished on the edges of the stem and blade of most examples.

Material: Light tan chert grading into black flint, apparently local in origin.

Provenience: Midden A (5), Midden B (14), random surface (2), unknown provenience (1).

Remarks: The diagnostic attributes of Variety 2 dart points are (1) their long, lanceolate blade, (2) barbless shoulders, (3) very slightly contracting stem, and (4) deeply concave base. Variety 2 compares in most details to Tunnell's Variety A at the Oblate Site (see p. 92).

Pedernales, Variety 3 (Fig. 4, G-I)

No. of specimens: 9

Form: The blade is long and relatively triangular, although the edges vary from straight to slightly concave or slightly convex. The shoulders are prominent and have short barbs. The stem is relatively narrower than in Varieties 1 and 2, and has approximately straight sides. The base is bifurcated as a result of a deep basal notch. Each of the two sections of the divided base is narrow and terminates in a fairly sharp point. The bases have not been noticeably thinned.

Dimensions: Overall length: average, 64 mm.; range of variation, 50 to 76 mm. Width at the shoulders: average, 32 mm.;

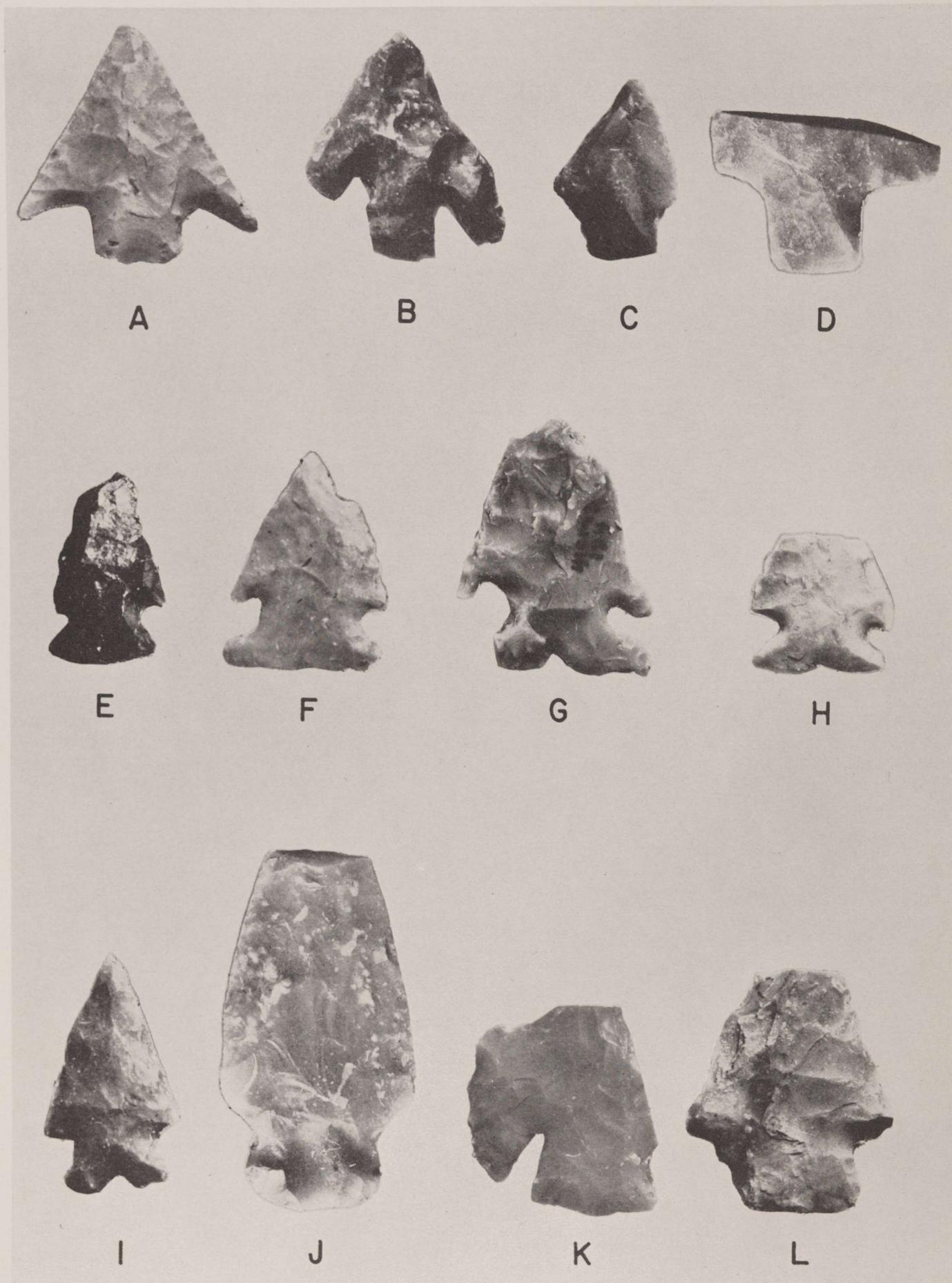


FIGURE 7. Dart Points. A, B, Shumla. C, D, Provisional Type I. E, F, Ensor, Variety 1. G, H, Ensor, Variety 2. I, Frio. J, Williams. K, L, Castroville. All specimens natural size.

range 26 to 40 mm. Thickness: average, 7 mm.; range, 5 to 10 mm.

Weight: Average, 10.7 gm.; range of variation, 8.2 to 18.5 gm.

Workmanship: Good, with secondary pressure flaking along the edges of both faces.

Material: Tan and gray cherts probably of local origin.

Provenience: Midden A (3), Midden B (4), random surface (2).

Remarks: The most diagnostic attributes of Variety 3 *Pedernales* points are (1) their short barbs, (2) narrow stem, and (3) sharply double-pointed bases.

Miscellaneous *Pedernales* points (Fig. 5, A, B)

In addition to the points described under the above three variety headings, 16 fragmentary dart points were found which belong to the *Pedernales* type, but which cannot be placed in specific varieties. However, these examples seem to fall well within the range of variation represented by the other *Pedernales* points from the site, although they do not show the same combinations of attributes which go to make up the varieties. Their stems are more or less straight-sided, bases are concave, and a few specimens have barbs. The size range falls within that of other *Pedernales* points, and all were manufactured from local tan and gray cherts. Provenience: Midden A (4), Midden B (12).

REFUGIO (Fig. 9, B, C)

No. of specimens: 2

Form: Long and slender; laurel leaf-shaped; edges convex. The base of the one complete specimen is convex. The body is quite thick with a longitudinal central ridge on both faces.

Dimensions: Overall length: specimen 1, 68 mm. (estimate); specimen 2, 60 mm. Width midway on the blade edges: specimen 1, 22 mm.; specimen 2, 21 mm. Thickness: specimen 1, 8 mm.; specimen 2, 10 mm.

Weight: Specimen 1, 13 gm.; specimen 2, 11.9 gm.

Workmanship: The percussion knapping technique appears to have been used exclusively.

Material: Local gray chert and agate.

Provenience: Midden A (1), Midden B (1).

Remarks: These two points fit the type description for *Refugio* given by Suhm, Krieger, and Jelks (1954: 474, Pl. 117). The most characteristic features are (1) the leaf-shaped blade, (2) rounded, convex base, and (3) thick cross section.

SHUMLA (Fig. 7, A, B)

No. of specimens: 2

Form: The blade is triangular and broad. Barbs are present and are relatively long, terminating in blunt ends on one specimen, in sharp ends on the other. The stem is short, subrectangular, has parallel sides and a relatively straight base.

Dimensions: Overall length: specimen 1, 44 mm.; specimen 2, 41 mm. Width at shoulders: specimen 1, 44 mm.; specimen 2, 39 mm. Thickness: specimen 1, 7 mm.; specimen 2, 6 mm.

Weight: Specimen 1, 6.8 gm.; specimen 2, 8.9 gm.

Workmanship: Good, with some secondary pressure flaking along the edges of the blade.

Material: Local gray chert.

Provenience: Midden A (1), miscellaneous test squares (1).

Remarks: The most salient characteristics of *Shumla* are (1) its subrectangular stem and (2) broad, triangular blade.

TORTUGAS (Fig. 9, E, F)

No. of specimens: 2

Form: These points are triangular in outline, are stemless, have relatively straight blade edges and a straight base. Alternate beveling occurs on the blade, with the beveled edge to the right when the points are oriented with the base down. The base on these specimens has been thinned by the removal of large flakes.

Dimensions: Overall length: specimen 1, 60 mm. (estimate); specimen 2, 41 mm. Width at the base: specimen 1, 30.; specimen 2, 24 mm. Thickness: specimen 1, 5 mm.; specimen 2, 4 mm.

Weight: Specimen 1, 9.7 gm.; specimen 2, 3.4 gm.

Workmanship: Good, with secondary pressure flaking along the blade edges.

Material: Local gray chert.

Provenience: Midden A (1), Midden B (1).

Remarks: The *Tortugas* type is characterized by (1) its triangular outline, (2) beveled blade, and (3) thinned base.

TRAVIS (Fig. 5, G, H)

No. of specimens: 3

Form: The blade is lanceolate, with convex edges. The shoulders are poorly developed, barbless, and rounded. The stem expands very slightly near the base, and has gently concave edges and a straight or slightly convex base.

Dimensions: Overall length, specimens 1, 2, and 3, respectively: 108 mm., 80 mm., and 64 mm. (lacking tip). Width at shoulders: 36 mm., 32 mm., and 28 mm. Thickness: 12 mm., 9 mm., 8 mm.

Weight: Specimens 1, 2, and 3, respectively: 42.1 gm., 20.9 gm., and 17 gm.

Workmanship: Rather crude, with large, irregular flakes removed by percussion; however, some evidence of pressure flaking can be seen on the edges.

Material: Local gray chert.

Provenience: Midden A (2), Midden B (1).

Remarks: The *Travis* type (Suhm *et al.*, 1954: 484, Pl. 121) is much like the *Nolan* type, except that it lacks the beveled stem of the latter. It is my feeling that *Travis* could advantageously be relegated to a variety position under the *Nolan* type, but more distributional data are needed before this change can be safely made.

WILLIAMS (Fig. 7, J)

No. of specimens: 3

Form: The blade is broad but varies from subtriangular to leaf-shaped, with slightly concave or convex edges. The shoulders are prominent but, on the Wunderlich Site speci-

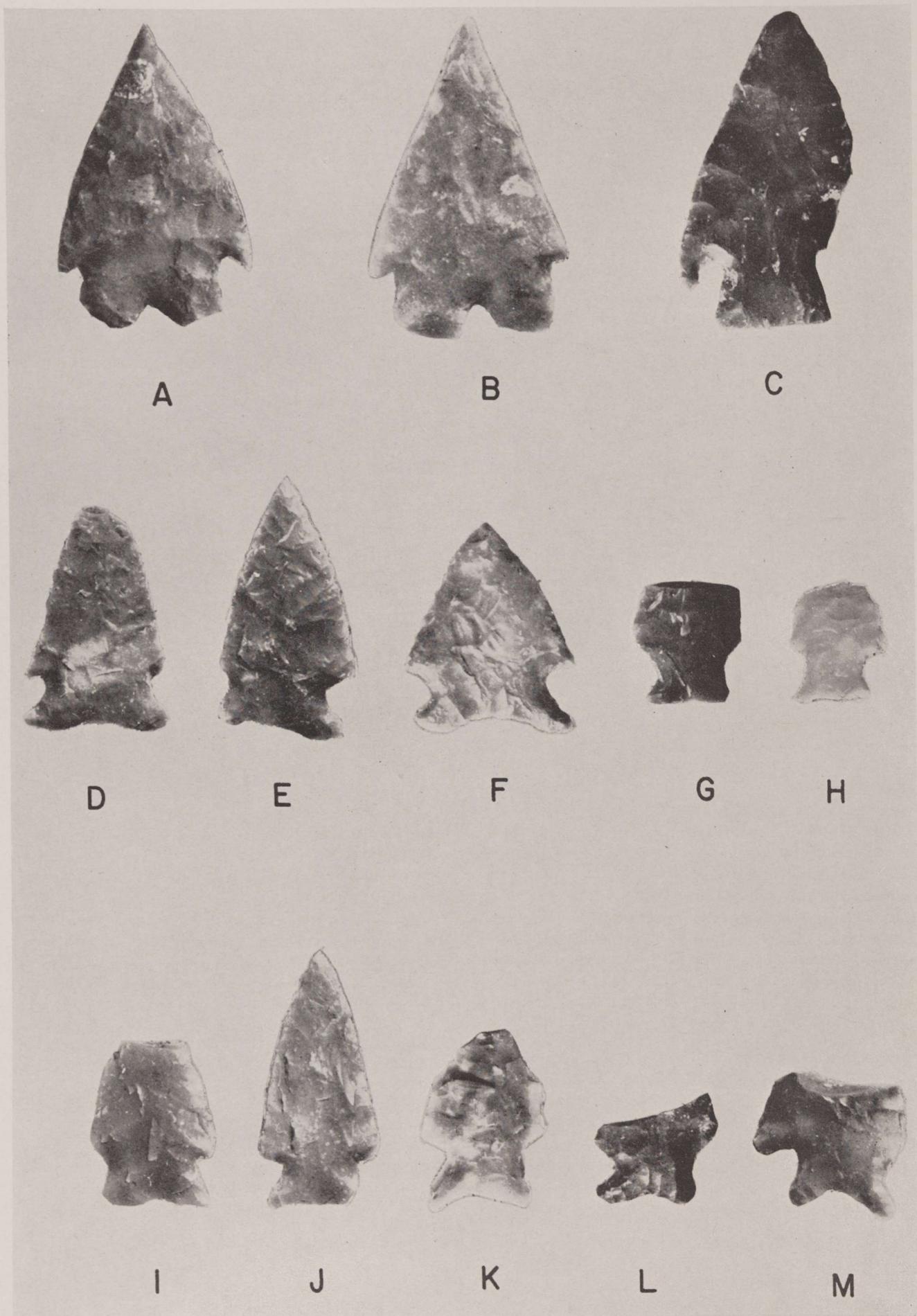


FIGURE 8. Dart Points. A, B, Montell. C, Lange. D-F, Provisional Type II. G-J, Provisional Type III. K-M, Provisional Type IV. All specimens natural size.

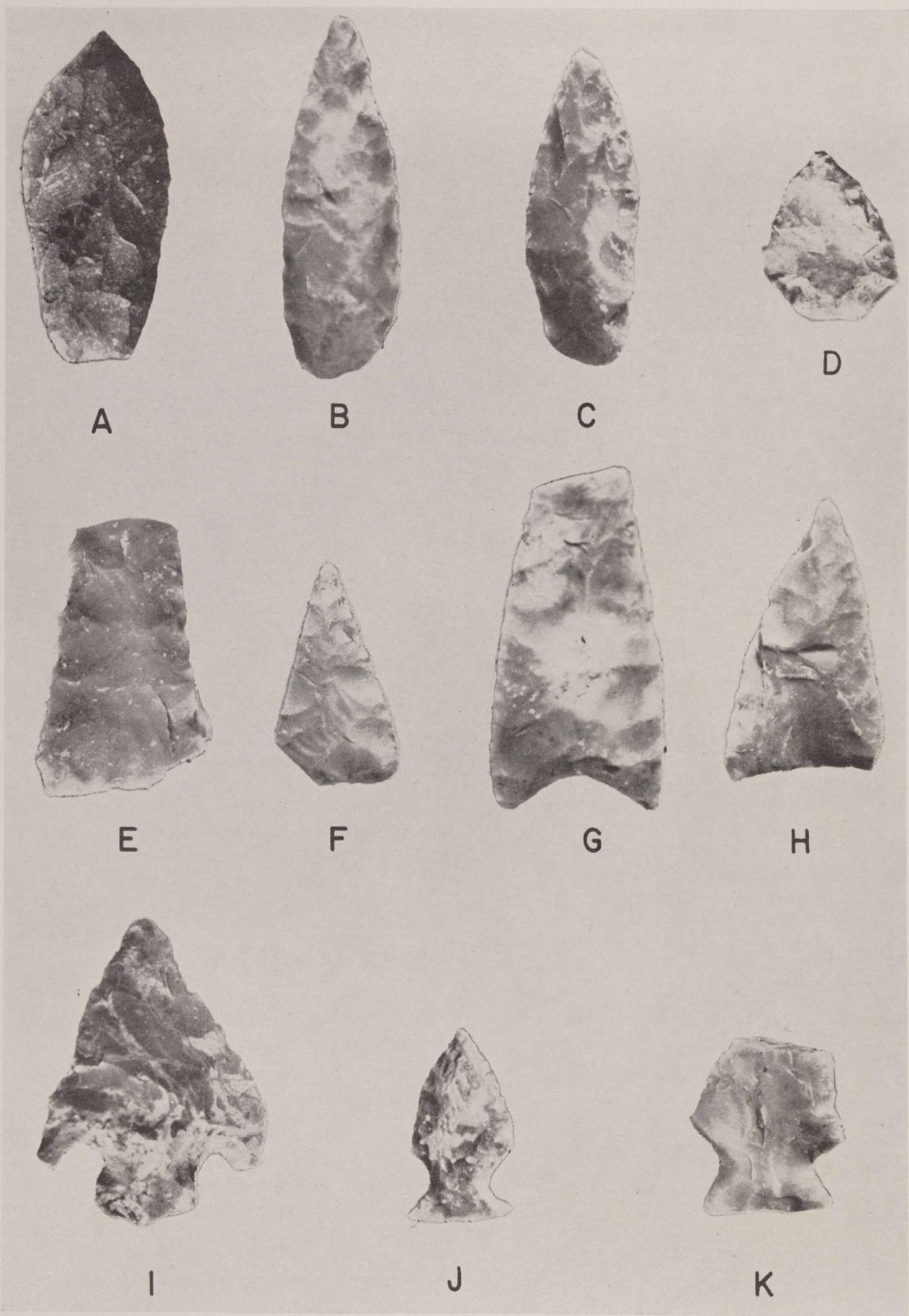


FIGURE 9. Dart Points. A, Angostura. B, C, Refugio. D, Catán. E, F, Tortugas. G, H, Kinney. I-K, Miscellaneous. All specimens natural size

mens, lack the barbs frequently found on points of this type. The stem is large, bulbous in outline, and has a generally convex base.

Dimensions: Overall length: specimen 1, 80 mm. (estimate); specimen 2, 67 mm.; specimen 3, 58 mm. Width at shoulders: specimen 1, 35 mm.; specimen 2, 27 mm.; specimen 3, 35 mm. Thickness: specimen 1, 5 mm.; specimen 2, 8 mm.; specimen 3, 6 mm.

Weight: Specimen 1, 20 gm.; specimen 2, 12.1 gm.; specimen 3, 11.5 gm.

Workmanship: Good; initial shaping was done by careful percussion flaking, followed by fine pressure flaking on the edges.

Material: Gray chert of local origin.

Provenience: Midden A (2), unknown provenience (1).

Remarks: The *Williams* type was defined by Suhm *et al.* (1954: 490, Pl. 124). Its most salient characteristic is its wide, bulbous stem.

PROVISIONAL TYPE I (Fig. 7, C, D)

The *Type I* category is composed of three highly fragmented dart points which, although lacking their blades, exhibit right-angle shoulders and small, narrow rectangular stems with straight sides and straight bases. Because of their fragmentary nature no measurements or weights can be given for them. All are made of locally derived chert. Provenience: Midden A (3).

PROVISIONAL TYPE II (Fig. 8, D-F)

This category consists of five dart points with triangular blades, expanding (corner-notched) stems, and shallow, concave bases. The overall length averages 41 mm. and ranges from 39 to 48 mm. The maximum width (at the base) averages 28 mm., while the range is from 25 to 30 mm. The maximum thickness averages 5 mm., while the weight ranges from 5.9 to 7 gm. In some respects this group of points resembles *Ensor*, but they are set off from *Ensor* because of their shallow, concave bases. A strong resemblance is also shown to the *Martindale* type, but the latter invariably has a much narrower stem and base. When more provenience and comparative data are made available, it may be possible to establish *Provisional Type II* as a discrete named type. All examples are made of locally acquired gray chert. Provenience: Midden B (1), surface (4).

PROVISIONAL TYPE III (Fig. 8, G-J)

This grouping is composed of four small and relatively light-weight dart points which have triangular or sub-triangular blades with straight or slightly convex sides, prominent barbless shoulders, and narrow, expanding stems with irregular, straight bases. The only complete specimen measures 45 mm. in length, but the remaining three, which lack their tips, appear to have been somewhat shorter. The maximum width at the shoulders aver-

ages 20 mm., and varies between 11 and 22 mm. The thickness of all four is 5 mm. and their weight ranges from 15.2 to 15.5 gm. Local gray chert was used in their manufacture. Similar small dart points (*Provisional Type C*) have been reported from the upper levels of the Devils Mouth Site (Johnson, 1961: Fig. 6, g-m) and from other places in the Amistad Reservoir area (Graham and Davis, 1958, Pl. 8 B, h, l). It seems certain that these points will prove to be late in the Archaic sequence and that they will extend over a rather large territory. Provenience: Midden A (1), Midden B (1), random surface (1), miscellaneous test squares (1).

PROVISIONAL TYPE IV (Fig. 8, K-M)

All four specimens of this group are fragmentary and lack the distal and medial portions of the blade, hence it is not possible to determine their original blade shapes. The shoulders, however, exhibit short barbs. The narrow stem is sharply expanding and appears to have been fashioned by notching the corners of the original blanks very deeply. The edges and base are deeply concave. Their overall length is approximately 35 mm. (estimate); the width at the shoulders averages 25 mm., and ranges from 22 to 31 mm. The thickness averages 5 mm. and ranges from 4 to 6 mm.

Because of the fragmentary nature of these specimens their original weights cannot be accurately determined. The workmanship is fair, but with relatively poor and irregular pressure flaking along the edges. Tan chert and black flint were employed in their manufacture.

These four specimens resemble the *Uvalde* type defined by Suhm, Krieger, and Jelks (1954: 486, Pl. 122) but are much smaller in size. The most diagnostic traits of *Provisional Type IV* are (1) the narrow stem with (2) concave edges and base. Provenience: Midden A (2), Midden B (1), miscellaneous test squares (1).

Miscellaneous Dart Points

The following projectile points cannot be related to established typological categories, but nevertheless seem to be typical representatives of the central and western Texas Archaic.

One of these (Fig. 9, I)—measuring 58 (length) by 42 (width at shoulders) by 13 (thickness) mm.—is an extremely crude point having the general outline of the *Shumla* type. Because of its crudeness and heavy weight, however, it is not described under that type heading. It weighs 18.7 gm. and was found on the surface of the site.

The second specimen (Fig. 9, J) is a small, well made dart point which measures 35 mm. in length, 18 mm. in width at the shoulders, is 6 mm. thick, and has a weight

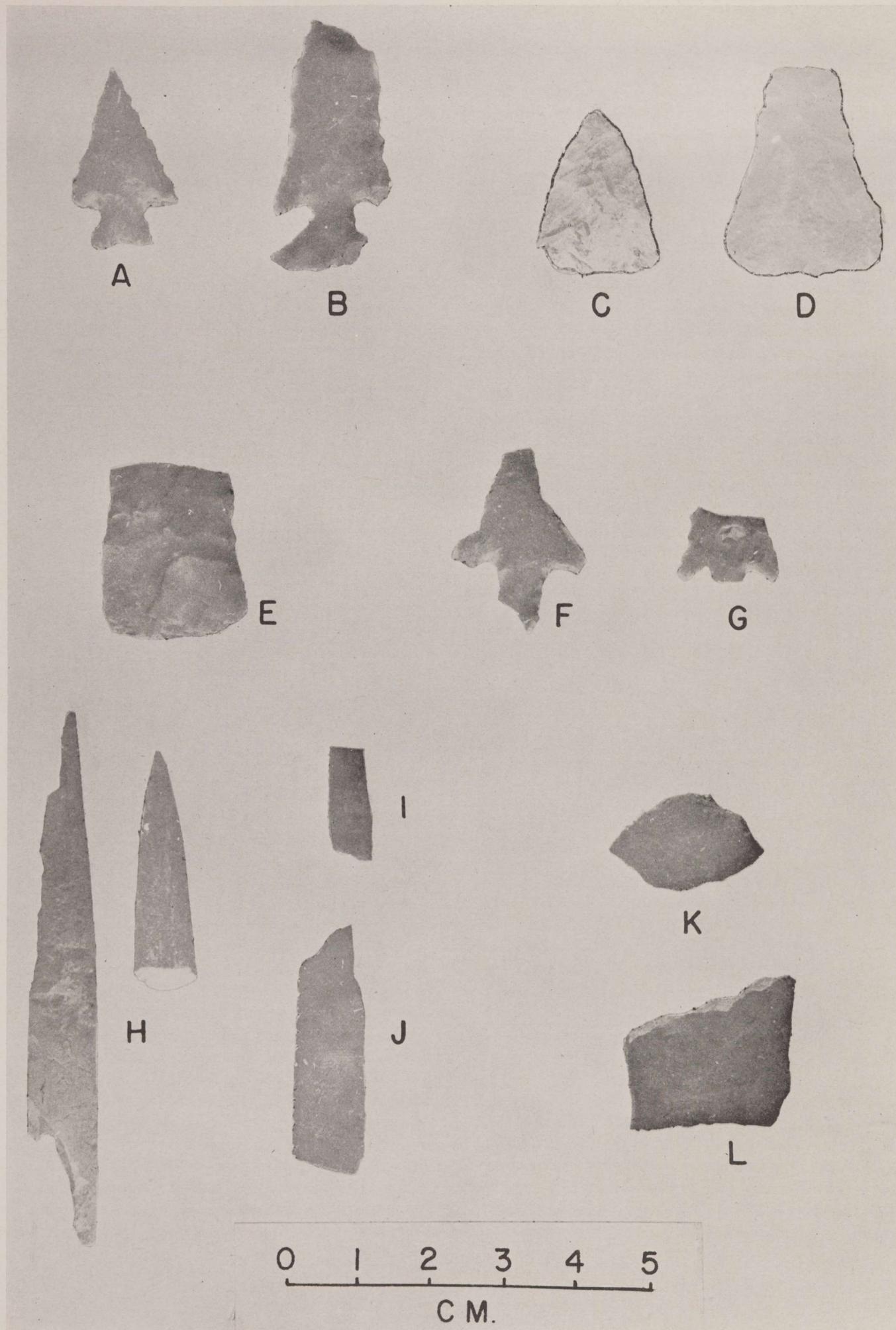


FIGURE 10. Arrow Points, Bone and Antler Artifacts, Potsherds. A, B, Scallorn. C, D, Fresno. E, Young.
F, G, Perdiz. H, Bone awls. I, Tip of antler awl. J, Bone artifact. K, L, Potsherds.

of 3.5 gm. This small point has very rounded shoulders, an expanding stem with concave edges, and a straight base. It particularly resembles certain points which have been recovered in the Amistad Reservoir area of western Texas (Graham and Davis, 1958: Pl. 6, 1, m; Epstein, 1960a: Fig. 11, A). This specimen comes from the surface collections.

A third fragmentary point (Fig. 9, K) has a straight-sided expanding stem, straight base, and appears originally to have had barbs. The blade shape cannot be reconstructed because of its fragmentary condition. Its original overall length is estimated at 45 mm., the width at the shoulders is 27 mm., and the maximum thickness is 5 mm. All three points were made from locally derived gray chert. This point was found on the surface of the site.

Seventeen additional dart point fragments were recovered, but these are so fragmentary (lacking their bases and most of their stems) that they cannot be described in any meaningful fashion, and they do not appear in the artifact tabulations (Table 1). All, however, are made of locally derived gray cherts and poor-grade agate. Also, 14 medial and distal blade fragments seem to have belonged to dart points, although some of these specimens may represent small knives. The blade fragments will not appear in the projectile point tabulations.

Arrow Points

FRESNO (Fig. 10, C, D)

No. of specimens: 4

Form: Subtriangular to triangular outline with straight, concave, or slightly convex edges and a straight base.

Dimensions: Overall length: average, 30 mm.; range of variation, 21 to 34 mm. (estimate). Width at base: average, 16 mm.; range, 15 to 21 mm. Thickness: average, 3 mm.; range, 3 to 4 mm.

Weight: Average, 1.5 gm.; range of variation, 1.3 to 1.8 gm.

Workmanship: Fair, with rather uneven pressure flaking on the edges.

Material: Local gray chert.

Provenience: Midden A (1), Midden B (2), miscellaneous test squares (1).

Remarks: The most characteristic traits of the *Fresno* type are (1) its small size and (2) subtriangular to triangular outline.

PERDIZ (Fig. 10, F, G)

Three fragmentary arrow points were found which seem originally to have had triangular blades and long, contracting stems, characteristics of the *Perdiz* type. Because of their highly fragmentary condition no measurements or further observations can be made. All three are made of locally acquired gray cherts. Provenience: Midden B (1), random surface (2).

SCALLORN (Fig. 10, A, B)

No. of specimens: 4

Form: The blades are long and triangular in outline, with straight edges. The shoulders have short barbs, and the stems are slightly to markedly expanding, with straight sides and bases. The two specimens with moderately expanding stems (Fig. 10, A) seem to conform to the description of the *coryell* variety of Jelks (1962:27-31), while the two with sharply expanding stems (Fig. 10, B) fit his *sattler* variety.

Dimensions: Length: average, 24 mm.; range of variation, 22 to 39 mm. (estimate). Width at the shoulders: average, 15 mm.; range, 14 to 16 mm. Thickness: 3 mm. for all four specimens.

Weight: Average, 1.2 gm.; range, 0.9 to 1.9 gm.

Workmanship: Good, with careful pressure flaking.

Material: Gray chert (3) and jasper (1).

Provenience: Midden B (2), miscellaneous test square (2).

Remarks: The most characteristic attribute of the *Scallorn* type is its expanding stem.

YOUNG (Fig. 10, E)

One fragmentary *Young* arrow point, lacking the blade tip, was recovered from the excavations at the Wunderlich Site. It is subtriangular in outline, has gently convex edges and base, and was made from a very thin concavo-convex flake. It was worked from only one face. It measures 19 mm. in width at the base and is 2 mm. thick. Local gray chert was employed in its manufacture. This point comes from one of the test squares.

Knives

Five rather distinct groups of knives, all worked bifacially and representing a wide range in size and form, were recognized at the Wunderlich Site. They are described below.

Group 1 (Fig. 11, A, B). This category, represented by 10 specimens, is typified by knives having a roughly oval outline, with convex blade edges and noticeably rounded extremities. The workmanship is fairly good, but primarily represents the hammerstone percussion knapping technique (in spite of the fact that two of the knives show evidence of slight pressure flaking along their edges, and another two have wide, shallow flake scars on their faces, indicative of the billet percussion technique). All were made of local gray cherts; their maximum length varies from 75 to 94 mm., the width from 34 to 48 mm., and the maximum thickness from 7 to 9 mm. Provenience: Midden A (6), Midden B (3), and miscellaneous test squares (1).

Group 2 (Fig. 11, C, D). This group contains three specimens which are quite wide, thin, and exceedingly well made. Their blade edges are markedly convex while

their bases are only slightly convex. Hammerstone percussion and/or the billet technique of knapping seem to have used in their manufacture; there is no evidence of secondary pressure flaking. The two complete specimens measure 118 and 94 mm. in length, 51 and 59 mm. in width, and 5 and 6 mm. in maximum thickness, respectively. All are of local gray chert. Provenience: Midden A (3).

Group 3 (Fig. 11, E, F). This category contains 10 specimens characterized by a general subtriangular outline. The blade edges are straight to convex, while the base is convex with gently rounded corners. The workmanship shown by these knives is rather poor, with large flakes removed from the faces by percussion. The length ranges from 69 to 71 mm., the maximum width (just above the base) from 39 to 56 mm., and the thickness from 5 to 11 mm. Eight were made of local gray cherts, two from agate. Provenience: Midden A (6), Midden B (4).

Group 4 (Fig. 12, A, B). This grouping includes eight large, crude, and thick specimens with a general subtriangular outline. Most of these would just as well fall into the "fist-axe" category, and resemble particularly the more well made Mousterian axes. Only one of the eight specimens exhibits much cortical patina at its base, although several other examples show small patches of cortex on their blade faces. The blade edges are convex, as are the bases of all the specimens. The maximum length ranges from 65 to 84 mm., the width (at the base) from 45 to 75 mm., and the maximum thickness varies from 9 to 27 mm. Seven were made of local gray chert and one from black flint. Provenience: Midden A (1), Midden B (6), random surface (1).

Group 5 (Fig. 12, C, D). This category includes five very small knives of a general subtriangular form. Were it not for their thickness and considerable weight, these specimens might well be considered as stemless dart points (see *Tortugas*, Suhm *et al.*, 1954: 482, Pl. 120); the decision to include them under the knife heading was somewhat arbitrary. Their blade edges are convex, but not markedly so, while their bases vary from straight to somewhat convex and have rather angular corners. Only percussion knapping was employed in their manufacture. Four were made of local gray chert, one from agate. Their length varies from 36 to 57 mm., the maximum width (at the base) from 20 to 30 mm., and the thickness ranges from 6 to 10 mm. Provenience: Midden A (1), Midden B (2), random surface (1), miscellaneous test squares (1).

Miscellaneous Knife (Fig. 12, E). This well made, long and slender knife does not fall within any of the above categories. It has slightly convex edges and a straight base; the length is 67 mm., the width (at the base) measures 34 mm., and the maximum thickness is 8 mm. It is made

of gray chert and was fashioned by means of percussion knapping. Provenience: random surface.

Large Bifacial Tools

Seven very large and crude bifacially worked artifacts (Fig. 15, A, B) were recovered which seem too large to be included within the knife category. They were made from cores, and still show patches of cortical patina on their faces. Their general outline is ovate, and large percussion flakes were removed irregularly from their surfaces. The maximum diameter ranges from 75 to 103 mm., while the thickness varies between 16 and 37 mm. All were made from local gray chert cobbles. Provenience: Midden A (2), random surface (5).

Drills

Three fragmentary drill bits and one complete drill were found at the Wunderlich Site (Fig. 12, F, G). The intact specimen has a long, narrow, diamond-shaped bit (in cross section), shoulders, and a rectangular stem with a relatively straight base. Of reddish-gray chert, it measures 73 mm. long, 20 mm. wide at the shoulders, and 10 mm. thick. The three fragmentary bits, all of gray chert, may have belonged to drills of the same type. Provenience: Midden A (2), Midden B (2).

Burin

One burin (Fig. 12, H), made from a fragmentary knife blade, was recovered from the site. Burin flake scars are present on both lateral edges, and were struck from one of the breakage surfaces which traverse the specimen. On one edge four distinct flakes were removed in succession, while only one was struck from the other edge. This artifact measures 45 mm. in width, and is made of local, impure gray chert. Provenience: Midden A.

Spokeshaves

Three artifacts were recovered which have a distinct, unifacially chipped concavity on one edge (Fig. 12, I, J). These were made from irregular flakes which show patches of original core cortex on the edge opposite the concavity. All are of local gray chert, and range from 37 to 68 mm. in maximum diameter. Provenience: Midden A (1), random surface (1), unknown provenience (1).

Fleshers

The term "fleshers" is suggested for five extremely large and crude end scrapers (Fig. 15, C, D). Because of their large size and steep bits it is possible that they were employed as fleshers in working the hides of large

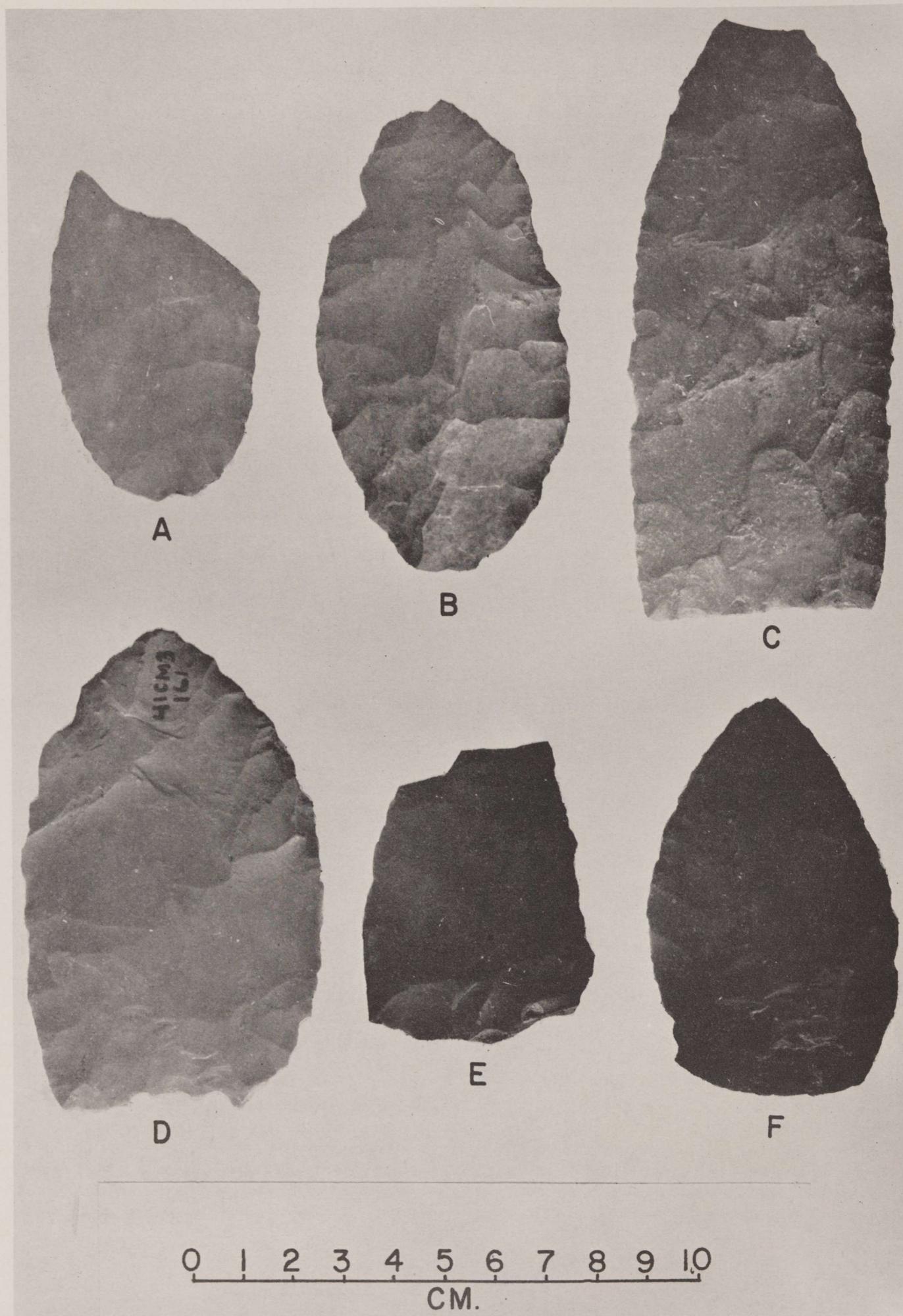


FIGURE 11. Knives. A, B, Group 1. C, D, Group 2. E, F, Group 3.

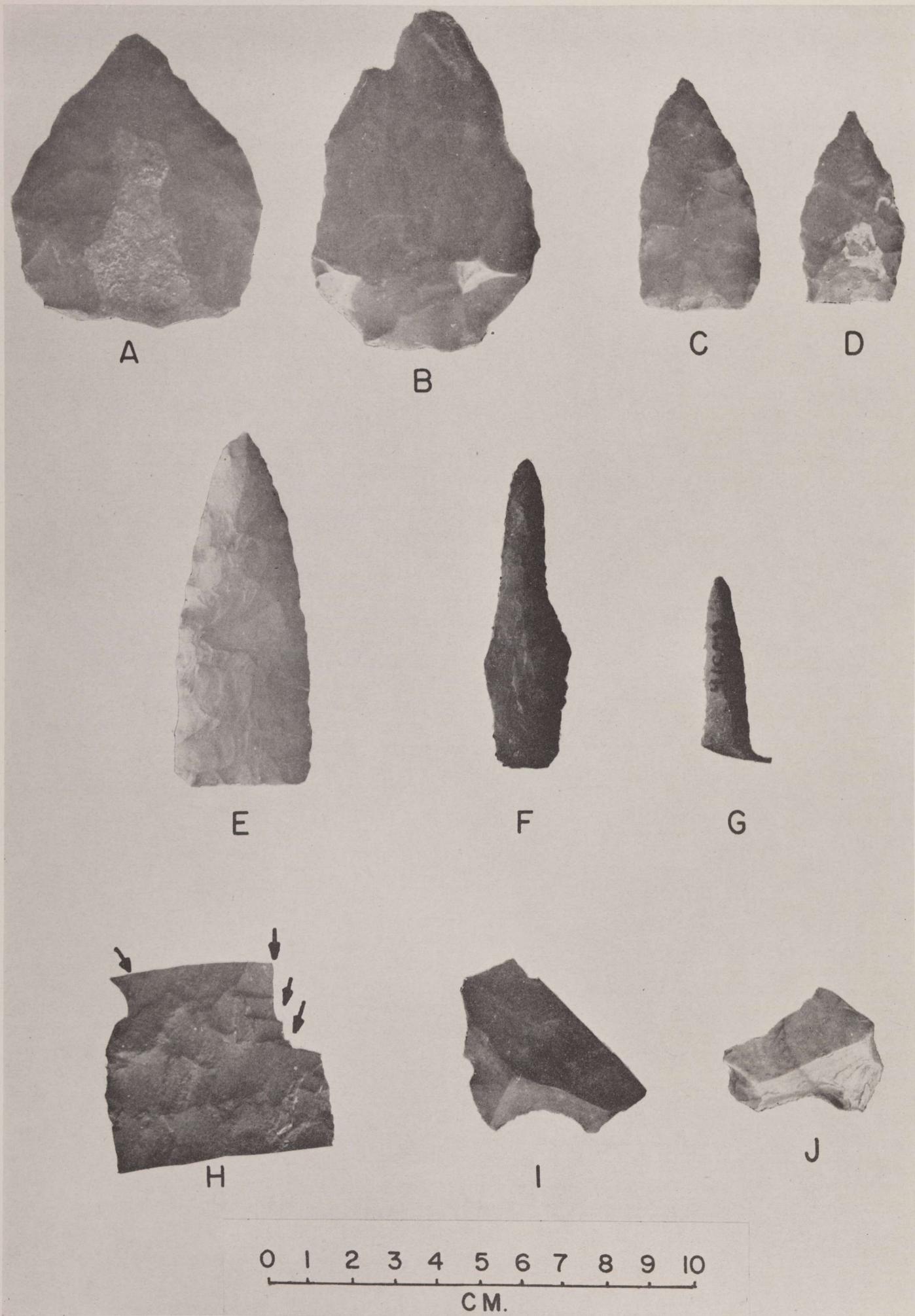


FIGURE 12. Knives, Drills, Burin, and Spokeshaves. A, B, Knives, Group 4. C, D, Knives, Group 5. E, Miscellaneous knife. F, G, Drills. H, Burin. I, J, Spokeshaves.

game animals, possibly bison. They are extremely heavy and crude, exhibit only percussion flaking, and are roughly plano-convex or concavo-convex in longitudinal cross section. The bits themselves range from slightly concave to convex. Their entire length varies between 60 and 100 mm. and their maximum thickness (at the bit) between 30 and 50 mm. All were manufactured from locally-available gray cherts. Provenience: Midden A (1), random surface (3), unknown provenience (1).

Scrapers

A total of 73 chert scrapers, representing a great range in style and form, was recovered from the Wunderlich Site. Among these, the following descriptive groups are recognized: (1) pointed scrapers, (2) two-edged side scrapers, (3) oval scrapers, (4) triangular end scrapers, (5) initial flake, single-edged side scrapers, (6) cortex flake, single-edged side scrapers, (7) use-worn side scrapers, (8) triangular scrapers, and (9) irregular scrapers.

Group 1, Pointed Scrapers (Fig. 13, A, B). Each of the three specimens belonging to this group is plano-convex in outline and exhibits two cutting edges which meet in a point at the apex of the artifact, producing an extremely rough triangular outline. Their maximum length ranges from 40 to 52 mm., and the thickness from 3 to 13 mm. Provenience: Midden B (1), random surface (1), miscellaneous test squares (1).

Group 2, Two-edged Side Scrapers (Fig. 13, C, D). This category, represented by four crude specimens, is identical to Group 1 except that two opposed scraping edges run approximately parallel to each other, and do not come together to form a distinct point. The maximum length varies between 57 and 60 mm., the maximum thickness ranges from 9 to 15 mm. Provenience: Midden A (1), random surface (1), miscellaneous test squares (2).

Group 3, Oval Scrapers (Fig. 13, E, F). Consisting of three crude specimens, Group 3 is characterized by a roughly oval outline and a plano-convex longitudinal cross section. Percussion flaking was employed around the entire circumference and was applied from the convex face. Small patches of cortical patina can still be seen in the middle of the convex face. The maximum diameter of these specimens ranges from 50 to 55 mm. and their thickness from 15 to 20 mm. Provenience: Midden A (1), random surface (2).

Group 4, Triangular End Scrapers (Fig. 13, G, H). The eight medium-sized scrapers belonging to this category are plano-convex in longitudinal cross section and exhibit a subtriangular outline with a convex bit opposite the apex. Three of these were worked on the edges as well as the bit. Though approaching a triangular shape, these

stand apart from the characteristically well made end scrapers of the Plains area. Their maximum length ranges from 30 to 74 mm., and the thickness from 4 to 14 mm. Provenience: Midden B (5), random surface (2), miscellaneous test square (1).

Group 5, Initial Flake, Single-edged Side Scrapers (Fig. 14, A). The 13 specimens of this category are designated according to the descriptive terminology of Epstein (1960a: 74-75), who recognized "initial cortex flake scrapers" in the Amistad Reservoir area on the Rio Grande. These are plano-convex unifacial tools which have a roughly oval outline. They were manufactured from the first flakes struck from the surface of cobbles and nodules, hence they exhibit the original cortex (patina) on their convex faces. The Wunderlich Site specimens, in distinction to the Amistad scrapers, are all single-edged side scrapers; many of the Amistad Reservoir specimens were retouched around much of the entire circumference. These 13 specimens vary between 135 and 51 mm. in diameter, and range from 7 to 29 mm. in thickness. Provenience: Midden A (2), Midden B (2), random surface (7), miscellaneous test squares (1), unknown provenience (1).

Group 6, Cortex Flake, Single-edged Side Scrapers (Fig. 14, B). The 21 crude unifacial tools of this group were manufactured from flakes struck from the center portion of a core or cobble after the removal of the initial flakes. They exhibit some traces of the cortex on their edges, but do not have cortex over most of one face as do the scrapers of Group 5. All these specimens are crudely worked on one edge, which varies from straight to slightly concave or convex. Similar groups of "cortex scrapers" were recognized at Amistad Reservoir by Epstein (1960a: 72-73). The size range of the Wunderlich Site specimens is like that of Group 5. Provenience: Midden A (4), Midden B (3), random surface (11), miscellaneous test squares (2), unknown provenience (1).

Group 7, Use-worn Side Scrapers (Fig. 14, C, D). This category is composed of 16 flakes (cortex flakes and a few flakes struck from polyhedral cores) which show very small flake scars along one or more edges. The flake scars are very tiny, in fact much smaller than flake scars generally produced by the pressure technique. Laboratory experiments were made by scraping various wooden objects with unmodified flakes, and edges identical to those on the Group 7 scrapers were produced by use-wear, and not by pressure flaking. These tools measure from 40 to 88 mm. in maximum diameter and range from 6 to 14 mm. in thickness. Provenience: Midden A (2), Midden B (8), random surface (2), miscellaneous test square (2), unknown provenience (2).

Group 8, Triangular Scrapers (Fig. 14, E, F). These two well made, thin specimens are subtriangular in out-

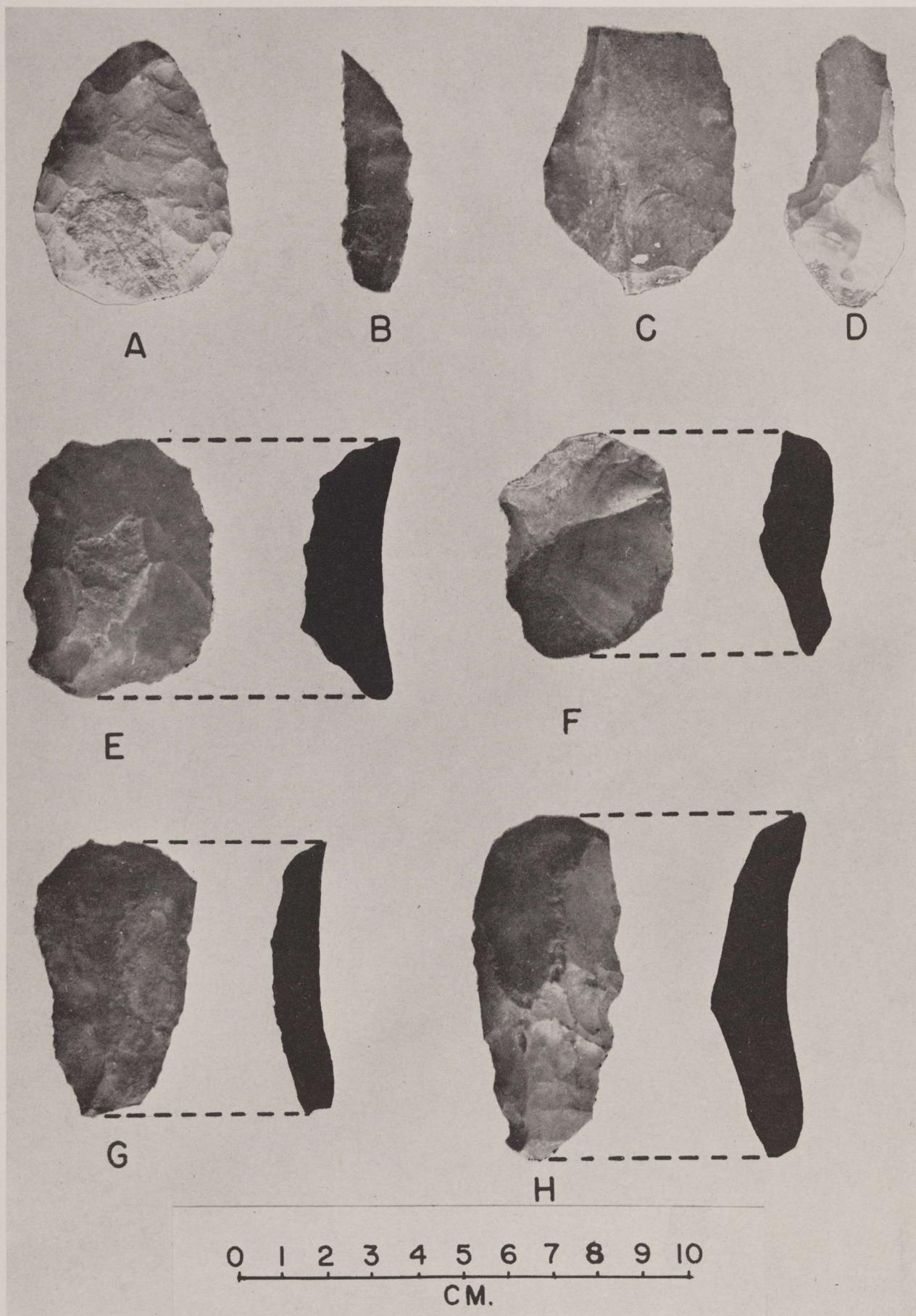


FIGURE 13. Scrapers. A, B, Group 1. C, D, Group 2. E, F, Group 3. G, H, Group 4.

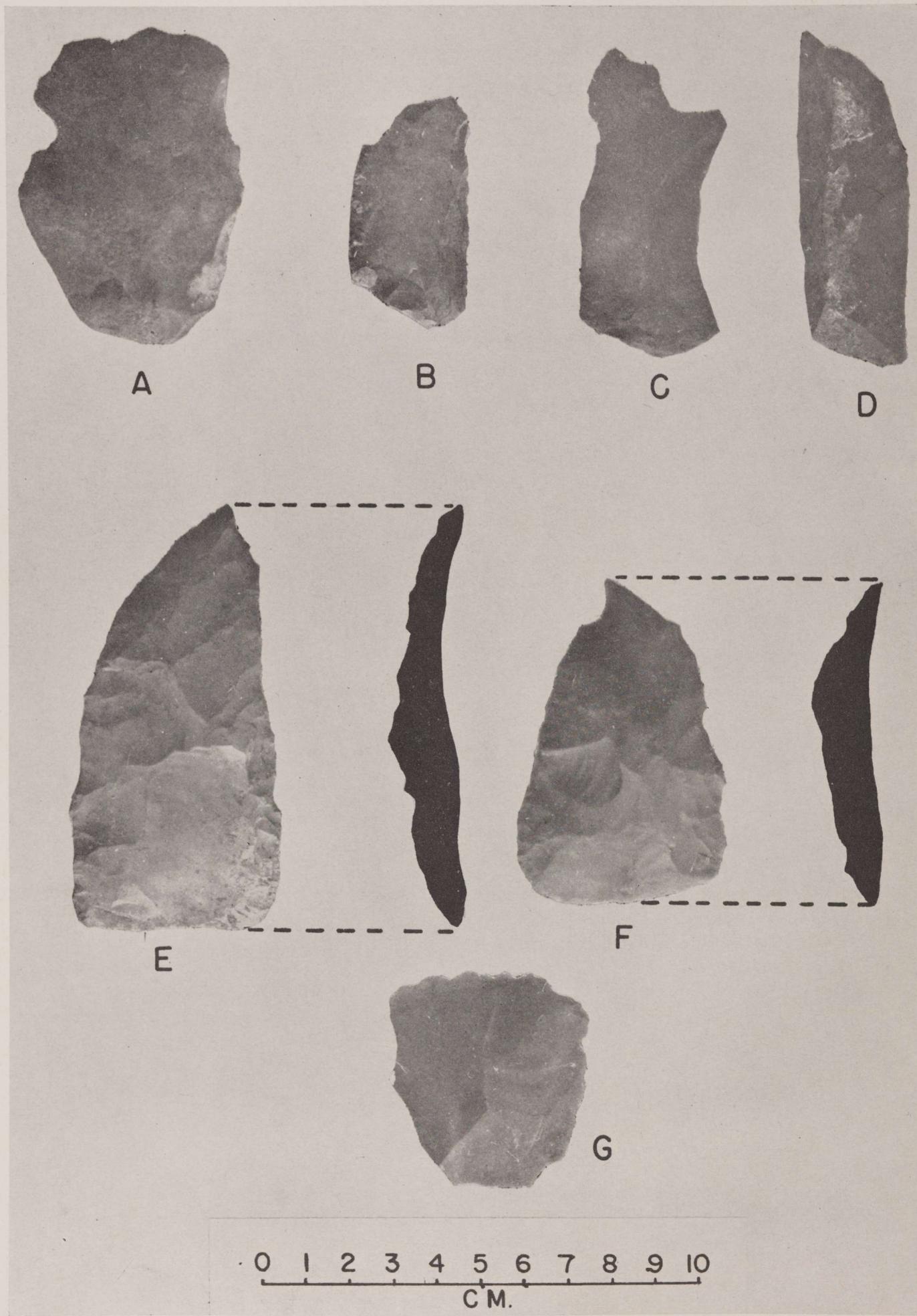


FIGURE 14. Scrapers. A, Group 5. B, Group 6. C, D, Group 7. E, F, Group 8. G, Group 9.

line and concavo-convex in longitudinal cross section. They are finely pressure flaked and unifacially worked around their entire circumference. No true bit can be recognized on these specimens, and all edges are very thin and perhaps were designed more for cutting than for scraping purposes. They are described here with the scrapers, however, because of their unmodified concave faces. Specimen 1 measures 98 mm. in length and 7 mm. in thickness, while specimen 2 measures 74 by 12 mm. Both show traces of a positive bulb of percussion near the end opposite the triangular apex. Provenience: Midden A (2).

Group 9, Irregular Scrapers (Fig. 14, G). This is a residual category for the three unifacial artifacts without symmetry or apparent systematic form. The edges of these are curved, sinuous, concave, straight, etc., and do not lend themselves readily to description. The maximum diameter varies between 27 and 48 mm. and the thickness is from 5 to 18 mm. Provenience: Midden A (2), Midden B (1).

In respect to their intended use, it may be surmised that most of the above-described scrapers were designed to be used as fleshers, or were used in removing hair from hides, although non-animal uses are also conceivable. Group 8 artifacts, however, were possibly employed as cutting implements. The large number of scrapers (as compared to the much smaller number of grinding tools) testifies, I think, to the relatively high popularity of hunting among the peoples who made and used the Wunderlich Site artifacts.

Choppers

A large group of 22 lithic artifacts represents crude chopping tools (Fig. 15, E, F). They consist of river or gravel cobbles of chert which have had large flakes knocked from one end by the percussion knapping technique. The flake scars are large and irregular, and result in an uneven edge which presumably served for chopping purposes. The extremity opposite the flaked end still retains all of its original cortical patina. There is much variety in size and form. The maximum diameter ranges from 55 to 105 mm., and the thickness from 30 to 60 mm. Provenience: Midden A (3), Midden B (5), random surface (13), miscellaneous test squares (1).

Chipped Hammerstones

Two lithic specimens (Fig. 15, G), almost identical to the above-described choppers, show a blunted, worked edge (lower edge of specimen in photograph) caused by repetitive hammering. Specimen 1 has a maximum diameter of 74 mm., and a thickness of 37 mm., while speci-

men 2 measures 70 by 31 mm. Provenience: Midden A (1), unknown provenience (1).

Manos

Four oval manos (Fig. 16, A) were recovered which have indistinct grinding facets on both faces. They are made of river-turned quartzite or impure chert cobbles, which were most likely obtained from nearby gravel deposits. These specimens, which were roughly shaped by the pecking technique, vary from 70 to 109 mm. in maximum diameter, and from 38 to 45 mm. in thickness. Provenience: Midden A (1), unknown provenience (1), miscellaneous test squares (2).

Pitted Manos

Three additional manos (Fig. 16, B) were found which are identical to the above specimens except in one particular: they have small pecked-out concavities on their surfaces. Two show one pit on each face, while the other has two pits on a single face. It has been suggested that such pits were used in breaking open nuts, or that these artifacts were used as anvil stones in the bipolar flaking technique (Honea, ms.). Provenience: Midden A (2), random surface (1).

Grinding Slabs

Two grinding slabs were recovered, and these were apparently used in conjunction with the manos for rotary grinding. One (Fig. 16, C) is large, measuring 180 mm. in diameter by 68 mm. in thickness, while the other specimen measures only 95 by 34 mm. Both exhibit concavities which served as grinding facets on one surface only. These concavities were formed by pecking. Both slabs are of fine-grained limestone and are relatively hard. Provenience: Midden A (1), random surface (1).

Ochre

Three small, unworked fragments of red ochre (hematite) were found at the Wunderlich Site. Their presence suggests that such stones were used by the occupants of the site in the manufacture of paint and pigments. Provenience: Midden B.

Bone and Antler Artifacts

Eight awls, or eyeless needles, were found which were fashioned from slivers of long bones (Fig. 10, H). All of these specimens have one pointed end which shows, in most cases, a high polish, presumably caused by use as awls in working leather and hides. Another awl fragment

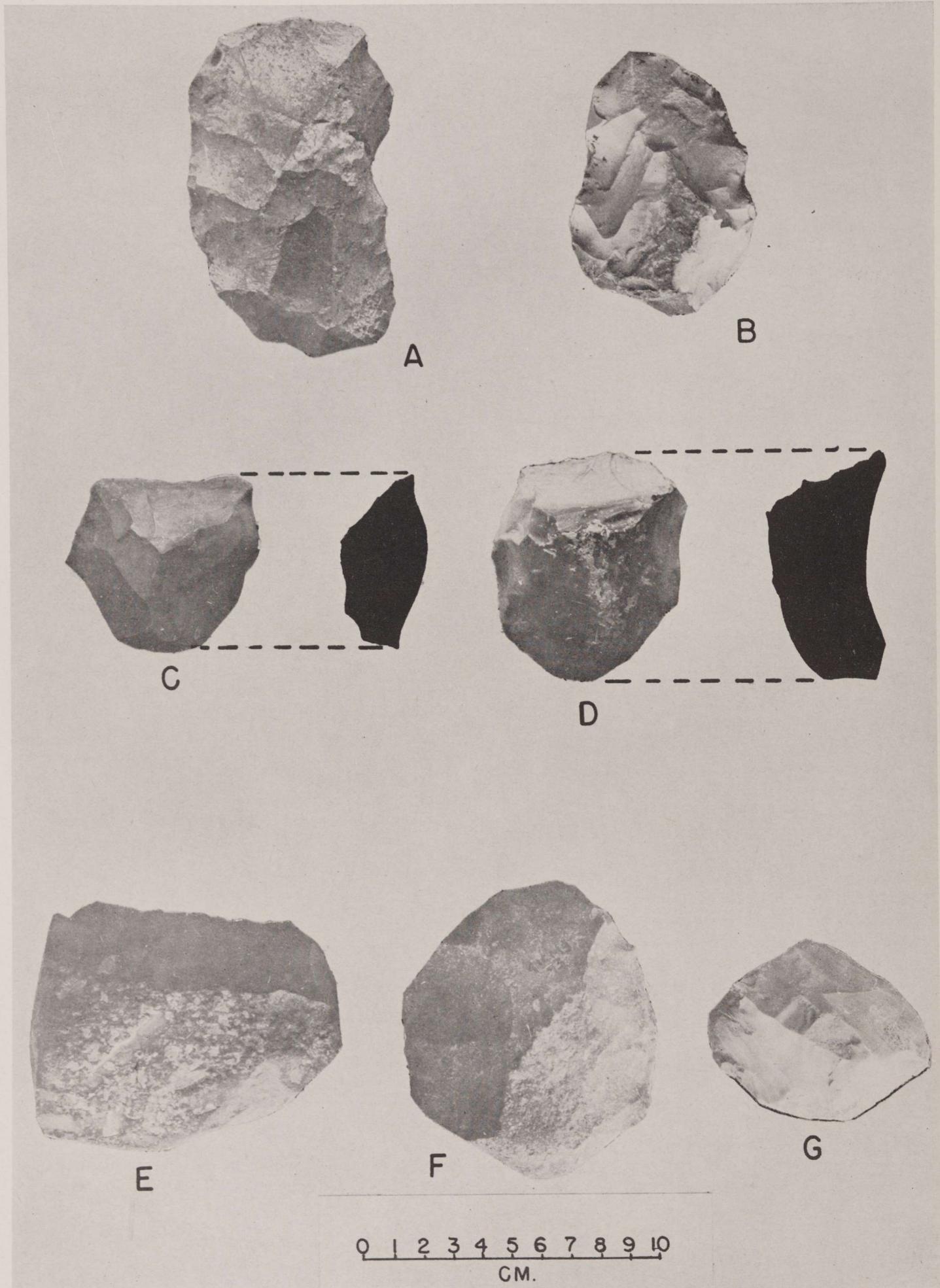


FIGURE 15. Large Chipped Stone Tools. A, B, Large bifacial tools. C, D, Fleshers. E, F, Choppers. G, Chipped hammerstone.

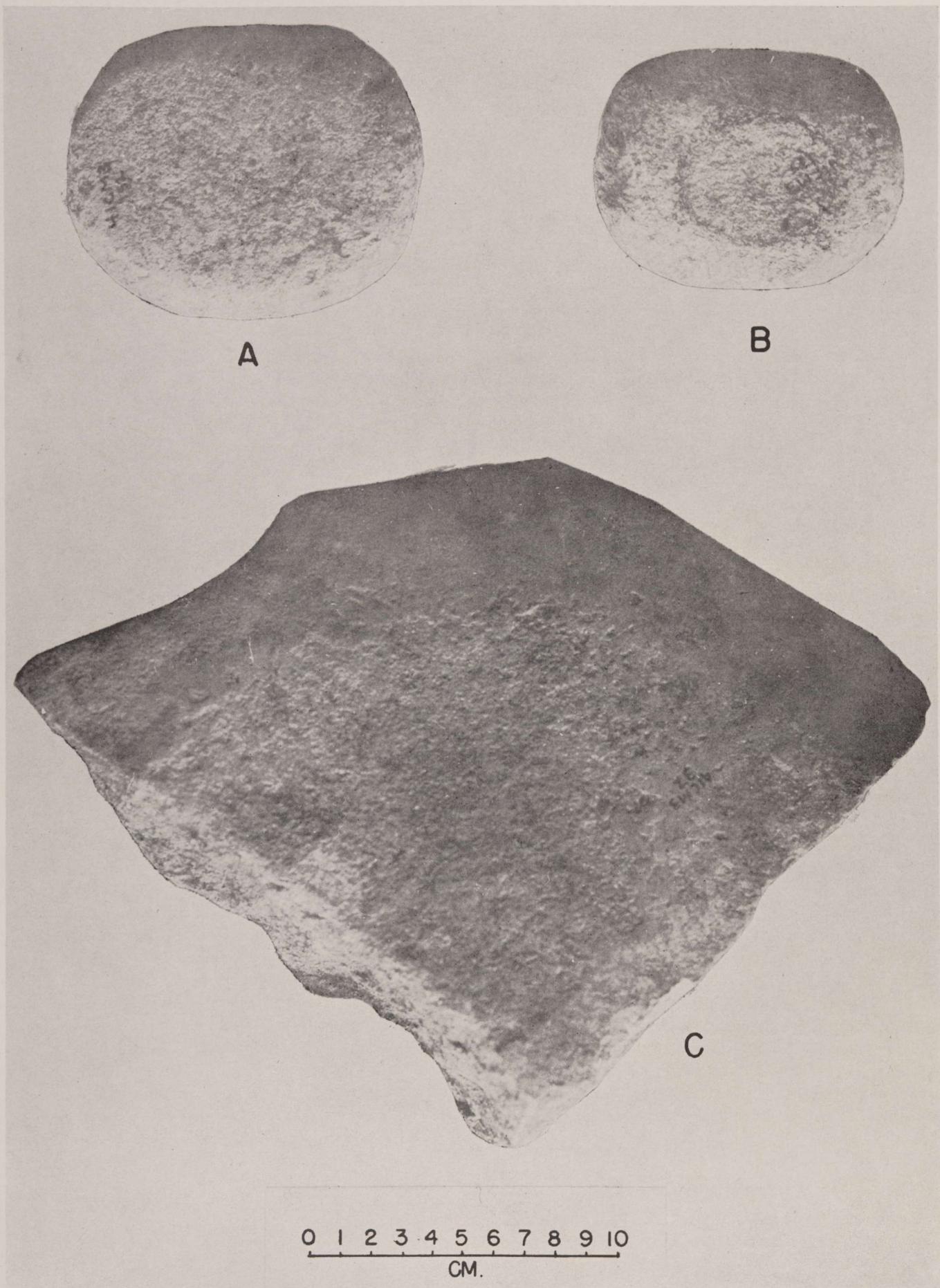


FIGURE 16. Manos and Grinding Slab. A, Mano. B, Pitted mano. C, Grinding slab.

(Fig. 10, I), consisting only of the tip of the artifact, was manufactured from an antler tine. The remaining bone artifact (Fig. 10, J) is flat and well polished, and has one notched or serrated edge. It may represent a bone gorget fragment. Provenience: Midden A (7), Midden B (2), unknown provenience (1).

Potsherds

Five very small potsherds (Fig. 10, K-L) were found at the Wunderlich Site; these have an average wall thickness of 7 mm. Their surface colors range from red-orange to orange-brown, and the surfaces of two of the five are very well polished. Their cores are uniformly brownish-black in color, seemingly indicative of an incompletely oxidizing firing atmosphere. Finely ground bone was employed as the major tempering agent. The surface hardness ranges between 3 and 4.5 according to Moh's Scale, which is at least one whole number higher on the scale

than most wares from eastern Texas, the main area where bone-tempering was practiced.

Although these five sherds appear to be of local manufacture, it is difficult to assign them to any definite type. Kelley (1947a) mentioned a central Texas type to be known as *Doss Redware*, although a definition of the type was never published. It seems that *Doss* is a reddish-orange-colored ware much like the sherds in question, except that *Doss* is characteristically thinner than the sherds from Wunderlich, and has a light-colored, oxidized core. Another central Texas type, *Leon Plain* (Suhm *et al.*, 1954: 114), is thicker than *Doss* and has a brown-colored surface. The Wunderlich pottery falls, perhaps, between the extremes of these two types as they are now imperfectly known, hence it cannot be determined under what grouping they should be included. A great deal more description and definition will have to be done on central Texas ceramics before one can begin to speak of definite type affiliations. Provenience: random surface.

TECHNOLOGY AND SUBSISTENCE

An examination of the various tools and the manufacturing residue recovered from the Wunderlich Site allows us to make certain observations and draw tentative inferences concerning the techniques employed by the Wunderlich people in artifact-making, and about the general economy or subsistence pattern of the inhabitants of the site. At the outset, it should be emphasized that, with the exception of the occupation represented by the rare arrow points and potsherds, a similar technological level is indicated from the earliest through the latest occupations. The prevalence of hunting and hide-working implements (dart points, knives, and scrapers) over grinding tools argues for a primarily hunting mode of subsistence with secondary reliance upon gathering. This is in contrast to many primitive cultures in similar environmental situations which had numerous grinding tools, and whose main preoccupations seemed to center around gathering seeds, nuts, and other plant parts (e. g., the Cochise Culture).

The lithic material at the Wunderlich Site is far and away the most abundant kind and will be considered first. We have two sources of data on the stone-working techniques employed by the inhabitants: (1) the tools themselves, and (2) the residue left over from their manufacture.

Flakes and Cores

Unmodified flakes and cores were examined from both

midden areas. The cores had been worked for the purpose of obtaining flakes for fashioning small artifacts (knives, points, etc.), and large flakes were removed around their entire circumference. These flakes were taken off by hammerstone percussion, generally without the advantage of a prepared striking platform. However, a few cores with prepared platforms were found at the site.

The numerous flakes recovered are indicative of several different knapping techniques. In describing them, the terminology used by Honea (ms.) will be employed in a modified form.

Because of secondary breakage and damage, many of the flakes could not be classified. However, among the identifiable pieces three distinctive styles of flakes were recognized: (1) prepared platform hammerstone flakes, (2) nonprepared platform hammerstone flakes, and (3) billet (cylindrical hammer) flakes.

The specimens belonging to the first group (Fig. 17, B) were struck by means of hammerstones from cores having prepared platforms. These flakes are relatively thick and irregular, and exhibit a portion of the original platform at one extremity. They also show a large, positive bulb of percussion which is a cone-like feature on the striking platform, partly contained within the flake mass.

The second group of flakes (Fig. 17, C)—nonprepared platform hammerstone flakes—is exactly like the preceding group except that there are no prepared platform fragments at the ends of the flakes. However, a positive bulb of percussion and a cone of percussion are always

present. It is puzzling to note that this group is found in smaller numbers at the site than the specimens with prepared platforms, particularly in view of the fact that non-prepared platform cores are much more common at the site than those with prepared platforms.

The flakes which are most numerous at the Wunderlich Site are the so-called billet flakes (Fig. 17, A). The billet technique is characterized by flakes with an oblique striking platform, when viewed in relation to the plane of fracture of the flake. When viewed from above, the platform is lenticular or sublenticular in outline. A slightly to markedly acuminate lip occurs along the entire edge of the platform, on the plane of fracture. In addition, billet flakes tend to be very flat and wide, and are noticeably smaller than those of the preceding two groups.

The techniques, then, which are represented by the non-utilized chipped stone fragments include (1) the hammerstone-knapping technique and (2) the billet technique. Completely absent are any indications of the bipolar technique, the lamellar technique, and the block-on-block technique.

The Artifacts

Turning now to the artifacts themselves, we find much evidence for percussion flaking on the core tools (choppers and hammerstones) and in the initial shaping of the flake tools as well (points, knives, and others). Pressure flaking, on the other hand, was employed for finishing the edges of knives and dart points, and was used only on a few of the larger artifacts. Pressure flakes—presumably because of their small size and the relatively large mesh of the hardware cloth used in screening—were not recovered.

Although rare, there is some indication of billet flaking on the artifacts (for example, the *Montell* points and Group 2 knives); we are presented, however, with something of a dilemma since billet flakes were the most commonly recognized type among the unmodified flakes, but billet-type workmanship was evidenced on only an insignificant number of artifacts.

In addition to the descriptive system for stone-working techniques employed above and devised by Honea (ms.), another classificatory system has been presented recently by Epstein (1960a: 31-33) for western Texas, and has

been employed in a modified fashion by the writer (Johnson, 1961: 265). This system deals primarily with flake classification and includes the following descriptive groups: *initial cortex flakes*, *long flakes* (some with prepared platforms), and *billet flakes*. A full description of Epstein's terminological system will not be repeated here, but it can be noted that Honea's prepared platform hammerstone flakes generally fall within Epstein's long flake grouping, and the nonprepared platform hammerstone flakes fall within both the initial cortex flake and the cortex flake categories. The billet flake groups are comparable in both systems.

The artifacts from the Wunderlich Site fit Epstein's classification quite readily. For example, the Group 5 scrapers were clearly manufactured from flakes of his initial cortex group, whose members are recognized by a *plano-convex* cross section and by the fact that the upper or convex surface of these specimens retains the original cobble surface (*cortex*).

Another example, Group 6 scrapers from Wunderlich, were all manufactured from large flakes of Epstein's cortex flake category.

These appear to have been knocked from a round or oval cobble by the simplest expedient of striking one end and gradually working backwards until the core was exhausted. The flakes formed in this way are essentially oval, tapered in cross section, have a negative bulb of percussion on one face and a positive bulb on the other and show the cortex of the cobble above the bulb of percussion (Epstein, 1960a: 32).

No flakes removed by billets appear to have been used for manufacturing artifacts at the Wunderlich Site. All of the artifacts are much too thick to have been made from the thin billet flakes.

In addition to the lithic materials and the few animal bones found at the site, the presence of bone awls affords another indication of a hunting economy, since they were presumably used in working hides and leather. The only indication of food-gathering activity, and this is of an indirect nature, comes from the use-ground milling stones and the manos. The pitted manos, as mentioned before, have sometimes been considered as indicative of the bipolar flaking technique, but I consider this usage somewhat doubtful at Wunderlich in view of the fact that no bipolar flakes or cores were observed in the collection.

PROVENIENCE OF THE ARTIFACTS

The location, by area and depth, of the major artifact groups appears in Table 1. Even though the number of artifacts recovered from the site is relatively small (355)—especially when compared to the yield of the larger

central Texas kitchen middens—there are some rather interesting and significant differences in vertical and horizontal distribution of the dart point types. However, since the other artifact classes are rather uniform in their dis-

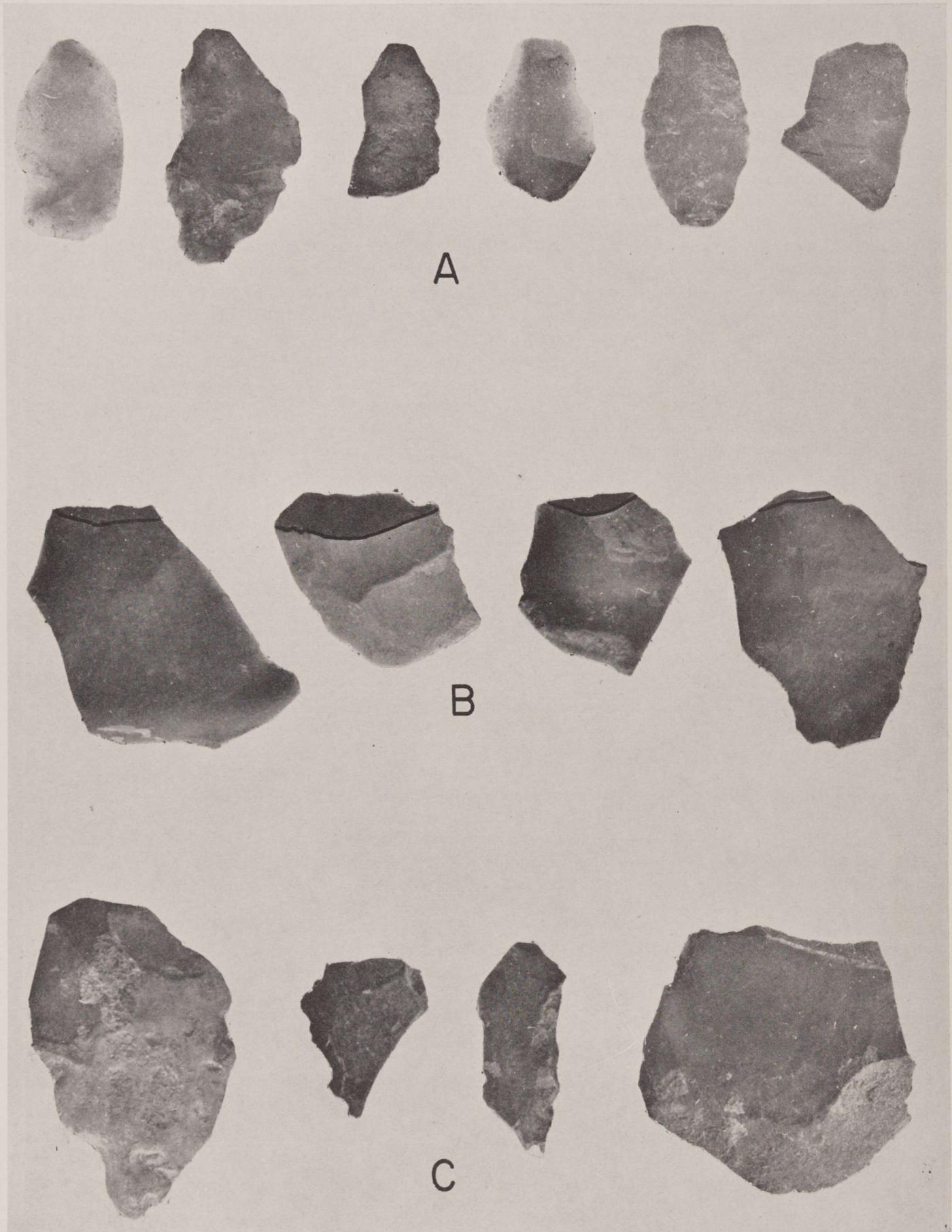


FIGURE 17. Flakes. A, Billet flakes. B, Prepared hammerstone flakes (link lines set off striking platforms). C, Non-prepared hammerstone flakes. All specimens natural size.

tributions, they need not be discussed in this chapter; their provenience can readily be obtained from Table 1.

Horizontal Distribution

The two middens contained somewhat different assemblages of dart point types. The other classes of tools were relatively well represented in both areas. The most common projectile point types found in Midden A were *Nolan*, *Bulverde*, *Langtry*, and *Pedernales*. Midden B, on the other hand, yielded only one main dart point type, *Pedernales*.

Vertical Distribution

Considering now the stratigraphic situation at the site, we also find several significant differences in distribution. An explanation concerning the vertical plotting of the artifacts is in order, however, before we commence the stratigraphic analysis.

All of the field excavating was done by arbitrary half-foot vertical intervals, as was stated earlier. However, an attempt was also made to relate the artifacts, as they were recovered, to the natural zoning of the site. This end was successfully accomplished in Midden A, for the most part, but much less satisfactory results were achieved in Midden B. Because of the clear zoning in Midden A, it was possible to determine the exact stratum from which particular artifacts came, at least in the greatest number of instances. In some cases, regrettably, there was some lack of certainty about precise stratum locations, and a specimen might be labeled "Zones A-B," or "Zones C-D," showing that such and such a specimen came from one of two adjacent zones, but it could not be determined which one. For this reason combinations of adjacent strata (A-B, B-C, etc.) appear in the provenience tabulations (Table 1).

In the case of Midden B it was not possible to correlate the depths of the artifacts with natural zoning while in the field, as the natural strata were relatively indistinct. Rather, an approximate correlation was attempted in the laboratory by using excavation-level data and excavation plans and profiles, but difficulties were encountered. Although it is felt that the Midden B provenience data are relatively accurate they do not have the same degree of reliability for stratigraphic analysis as do those of Midden A. Fortunately for the present study, Midden B yielded only one main dart point type (*Pedernales*) and the uncertainty of the stratigraphic situation there is of no great consequence.

Midden A

An examination of the vertical distribution of the artifacts in Midden A reveals three clusterings of dart point

types at different depths, which presumably correspond to discrete periods or phases in the occupation of the site. These periods, designated herein by Roman numerals I through III, are meant to serve as very gross, general time-groupings, each of which may conceivably encompass several occupations of the site by different groups.

Period I at the Wunderlich Site, Midden (Area) A, is represented by two main dart point types, *Nolan* (12 specimens) and *Bulverde* (7), which occur in Zones A through B-C (Table 1). Minor types also found at these depths include *Angostura* (1), *Travis* (2), *Refugio* (1), and *Tortugas* (1). It is not necessarily thought that all these points represent one occupation, particularly since *Angostura* is generally relegated to the Paleo-Indian Stage. It will be observed that all of the dart points belonging to the Period I clustering represent either points which lack stems, or points which have straight-sided stems.

Period II is represented by a clustering of points in the middle zones, principally B-C through C-D, where relatively large numbers of *Pedernales* (18) and *Langtry* (7) points were found. The minor types consist of *Provisional Type I* (3), *Lange* (1), and *Shumla* (1). These specimens seem to represent, particularly in view of the predominance of the *Pedernales* type, what Kelley (1947a; 1947b) referred to as the Round Rock Focus, although several occupations by peoples bearing different dart point types may be included here.

Period III includes a small clustering of projectile points near the surface of Midden A, in Zones C to D. Here were found the *Castroville* (2 points), *Montell* (2), *Frio* (1), and *Ensor* (3) types as well as *Provisional Type III* (1), and *Provisional Type IV* (2); in addition to the aforementioned dart points, one *Fresno* arrow point was recovered in Zone D. In the main, the specimens of Period III seem to represent what J. C. Kelley (1947a; 1948) has referred to as the Uvalde Focus of the Archaic Stage. However, the *Fresno* arrow point is of the later Neo-American Stage, probably the Central Texas Aspect.

It appears to be anomalous that the expanding stem *Williams* type, represented by two specimens, occurred in the deep levels of Period I. All the other expanding stem forms are from Periods II and III, and are most characteristic of Period III. Possibly these two points are intrusive into the lower levels, hence *Williams* is not included among the types listed for Period I.

It should also be mentioned that a few specimens of some types were found in positions inconsistent with their more general occurrence, and may be presumed to indicate mixture. One point each of the *Nolan* and *Bulverde* types, for example, were recovered from Zone D, far above their usual low position. At least a small amount

Table 1. Provenience of the Artifacts, Wunderlich Site

	Midden A					Midden B					Misc. Test Squares	Unknown Provenience		Totals:
	A	B	C	D	E	A-B	B-C	C	D	E	Surface			19
<i>Artifacts:</i>														
Dart Points:														
Nolan	1		4											9
Bulverde, v. 1	1		2											3
Bulverde, v. 2			1	1										3
Travis				1										1
Angostura														2
Refugio														2
Tortugas														2
Kinney					1									9
Langtry		1	4	1	1									2
Shumla			1											16
Pedernales, v. 1			3	1	3									22
Pedernales, v. 2		1	2	2										9
Pedernales, v. 3	1		1	1										16
Misc. Pedernales	2		1											3
Prov. Type I	1		1		1									2
Lange			1											3
Williams					1									3
Castroville	1			1										7
Montell	1	1												1
Frio	1													2
Ensor, v. 1	1													4
Ensor, v. 2	2													6
Catán														1
Prov. Type III	1													4
Prov. Type II														5
Prov. Type IV	2													4
Misc. Dart Points														3
Arrow Points:														
Scallorn														2
Fresno	1													4
Young														1
Perdiz														3
Knives, Group 1			1	1	2	2								10
Knives, Group 2			3											3
Knives, Group 3		1	1	1	2	1								10
Knives, Group 4						1								8
Knives, Group 5						1								5
Misc. Knife														1
Large Bifac. Tools			1											7
Drills				1	1									4
Burin					1									1
Spokeshaves				1										3
Fleshers					1									5
Scrapers, Group 1														3
Scrapers, Group 2					1									4
Scrapers, Group 3	1													3
Scrapers, Group 4														8
Scrapers, Group 5	1		1											13
Scrapers, Group 6	1				1	1	1	2						21
Scrapers, Group 7						2		5						16
Scrapers, Group 8					1		1							2
Scrapers, Group 9						2	1							3
Choppers	1		1		1			2	2					22
Chipped Hammerstones	1													2
Manos					1									4
Pitted Manos					2									3
Grinding Slabs	1													2
Ochre							3							3
Bone and Antler Tools	3		1	1		2				1	1			10
Potsherds												5		5
TOTAL														

of such admixture is invariably encountered in the midden sites of the central Texas area.

Midden B

Turning now to Midden B, we find a much more simple distribution pattern. The main dart point type is *Pedernales*, with a total of 36 examples occurring throughout all strata except Zone A, which yielded only one dart point (*Travis* type). This abundance of *Pedernales* is comparable to Period II at Midden A. In the uppermost zones of Midden B, on the other hand, a few points of the Midden A Period III occurred: *Montell* (3), *Ensor* (1), and *Provisional Types II* (1), *III* (1), and *IV* (1). Found in the surface zone were two *Scallorn*, two *Fresno*, and one *Perdiz* arrow points. In addition, a very few examples of the Period I dart points were scattered throughout the various zones, but these were out of position and almost certainly represent admixture.

Midden B, then, has no clear evidence of Period I, but contains mainly Period II types together with a small

sample of Period III forms, and several Neo-American arrow points.

The random surface collection (Table 1) made at the site yielded examples of most of the main dart point types, the more common classes of other artifacts, and five small potsherds.

Although the vertical distributions of the three clusterings (periods) of dart points overlap each other somewhat, this does not necessarily demonstrate their partial contemporaneity. Seemingly discrete strata in central Texas burned-rock middens can be quite deceptive, for the artifacts contained therein do not necessarily represent primary cultural association. In sites which were occupied sparsely by small bands during a period of some thousands of years in a locality which was neither building up nor eroding to any large extent, it is to be expected that any originally pure components would be considerably mixed with other materials—earlier or later. This would especially be the case in the zones of contact, the intermediate levels. We have to contend here not only with a stable surface and the actions of rodents and tree roots, but with such human activities as pit digging and the construction of fire hearths.

ANIMAL REMAINS

A relatively large number of snail and mussel shells, as well as a few animal bone fragments, were found at the Wunderlich Site. Unfortunately, however, the genera and species could not be identified in time for their inclusion in this report.

The presence of these remains at the Wunderlich Site indicates that both hunting and foraging were part and

parcel of the local subsistence pattern. A cursory examination indicates that many of the bones are of deer and other relatively large animals, including a small sample of bison, and that a number were broken open to obtain marrow. The snails and shellfish were most likely gathered by the women as a regular part of their foraging activities.

CONCLUSIONS

We can draw the following conclusions from the work done by the Texas Archeological Salvage Project at the Wunderlich Site:

1. The total assemblage of tools is indicative of a hunting subsistence pattern with secondary reliance upon food gathering and foraging. Grinding tools of any sort are rare at the site.
2. The site was occupied from early Archaic into Neo-American times. The only indication of a possible Paleo-Indian Stage is a single *Angostura* dart point. However, there is no good evidence of a Paleo occupation of the site.
3. Three periods, marked by stratigraphically distinct clusterings of dart point types, were recognized at the site.
4. The earliest occupation (Period I) at Wunderlich has, primarily, the *Nolan* and *Bulverde* dart point types.

5. Period I is overlain by Period II artifacts—represented principally by *Pedernales* dart points.
6. The presence of *Langtry* points in the *Pedernales* zones suggests a rough correlation of Period II with the material from western Texas which Kelley labeled the “Pecos River Focus.”
7. Period II materials, in turn, are overlain by artifacts of Period III, characterized by *Montell*, *Frio*, and *Ensor* dart points.
8. A few dart points (*Provisional Type III*) are suggestive of a transitional or exceedingly late Archaic; also, a few Neo-American arrow points and potsherds were recovered in the upper levels and from the surface of the Wunderlich Site.
9. A sequence of dart point stem styles from straight (or slightly contracting) to expanding (side and corner-notched) forms can be demonstrated for the Wunderlich Site. This sequence is roughly similar to that recognized by Epstein (1960a) in the Amistad Reservoir area of western Texas.
10. The stratigraphic situation at the site—with the superposition of three discrete dart point periods—may prove to be a valid chronology for all of central Texas.



FOOTBRIDGE: A TERRACE SITE

DEE ANN SUHM

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INTRODUCTION

The Footbridge Site (41CM2) is located in Comal County, Texas, on the north bank of the Guadalupe River, about seven miles upstream from the Canyon Reservoir damsite. It consists, primarily, of several occupation zones buried in alluvial fill of the Guadalupe River. Work at the site was carried on for two weeks in the summer of 1960, under the supervision of Curtis D. Tunnell and Dee Ann Suhm. It is one of the three sites excavated thus far in the Canyon Reservoir area (see Preface and Fig. 1).

The initial survey of the reservoir area was conducted

in 1949 by Robert L. Stephenson (1951), then working out of the Austin office of the River Basin Surveys, Smithsonian Institution. The Footbridge Site, however, was not located at that time. It was found in 1959, when the first season of more intensive archeological investigations began in the Canyon Reservoir area. A roadcut through the Footbridge Site (Figs. 18, 20) had exposed, at various depths, concentrated evidence of occupation. The possibility of obtaining cultural stratigraphy seemed good and recommendations were made for limited exploration of the site. This paper reports the results of these investigations.

ACKNOWLEDGMENTS

A number of individuals have contributed to the preparation of this report, including Kenneth H. Honea who examined the chippingdebitage, LeRoy Johnson, Jr., who generously made available his findings at the nearby

Wunderlich Site, Edward B. Jelks and William W. Newcomb, Jr., who offered many constructive suggestions, and Hal Story who drafted the maps of the site. Their co-operation and assistance are greatly appreciated.

DESCRIPTION OF THE SITE

Situation

Located at the confluence of the Guadalupe River and Sorrell Creek, most of the Footbridge Site is buried in thick alluvial deposits. In general, the site slopes to the south and east, and rises to the north and west. The southern edge of the site is sharply defined by a 27 foot bluff which descends abruptly to the Guadalupe River. Buried occupation zones, marked mainly by hearthstones and an occasional flint flake, are exposed in this bluff. To the west the deposits slope more gradually—a drop of 25 feet in a horizontal distance of 40 feet—to the bed of Sorrell Creek, a small intermittent stream. Since this slope supports a fairly dense mantle of vegetation, no cultural debris was observed in this area, and it is possible that the site does not extend this far to the west.

The alluvial deposits in which most of the site is buried rest against a low (remnant) limestone hill. Limestone ledges which mark one edge of this hill outcrop along the southern fringe of the site. The hill itself rises gradually

to the northwest. An old road, possibly once used by wagons, runs in a north-south direction through the center of the site. In general, it demarcates the boundary between the alluvium and the limestone hill (Fig. 18).

Surface indications of occupation were found in three apparently distinct areas (Fig. 18). The main concentration of detritus was in the southern portion of the site, and is designated as Area A. To the north and west, on the limestone hill, was a second area, B. The third concentration, labeled area C, was also in alluvial fill, but was located several hundred feet north of Area A. It consists of limited cultural material exposed by gully erosion.

Excavations were restricted to Area A, as this seemed to be the most promising of the three. The relationships between the three areas, since all were not excavated, remain undetermined. Area B yielded largely heavy, crude implements from the surface and may have been primarily a chipping site. However, the finer specimens, especially the projectile points, may have been picked up by artifact collectors. Only a handful of material, also from the sur-

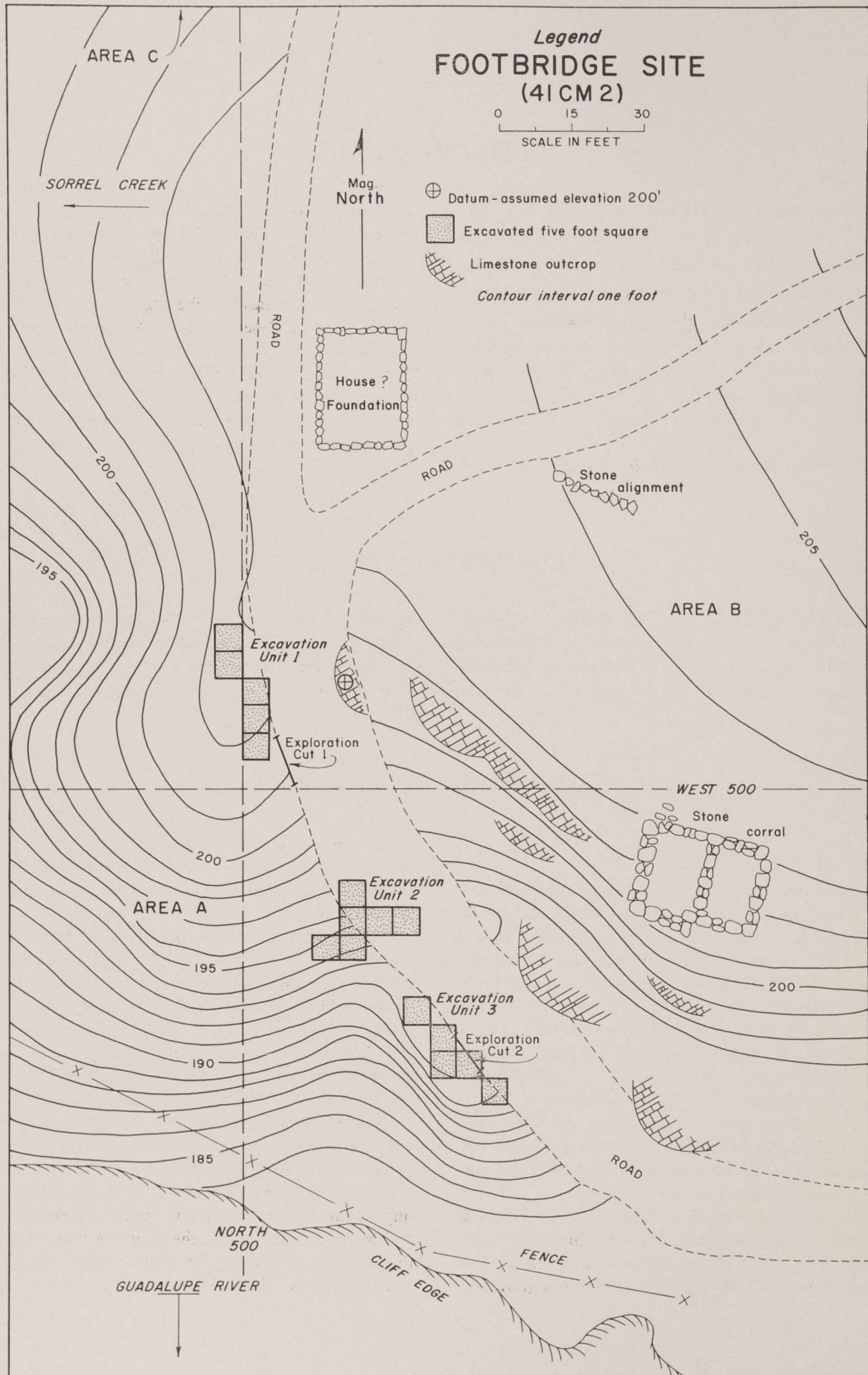


FIGURE 18.

face, was collected from Area C. Although the two are separated by a considerable distance, Area C may be continuous with Area A; the region in between was not eroded and there was not time to test it.

The southern part of the site, Area A, supports a substantial stand of trees, chief of which are hackberry and elm. In certain portions of the site the tree roots handicapped the excavations, and the foliage made mapping tedious. The more open portions of the site are covered with a good growth of grass.

Unfortunately, the geology of the site is poorly understood. Excavations into the alluvial fill suggested that the site (at least Area A) is geologically complex and that more extensive excavations—probably not warranted by the archeological remains—are required to understand fully the sequence of deposition. A correlation with terraces already recognized and defined for the Guadalupe River (Deussen, 1924: 117) is virtually impossible, largely because the site has been disturbed by the roadcut and has undergone extensive erosion. On the basis of present knowledge of the site, it cannot even be determined whether one or two terraces are represented.

Internal Structure

Excavations in Area A were concentrated in three somewhat separated areas which are designated as excavation units I, II, and III. Several rather clearly defined zones showed up in the southern portion of Area A, in Excavation Unit III and, to a lesser extent, in Unit II (Figs. 19, 20). No distinct cultural or geological zoning, however, was observed in the northern part of the site, in Excavation Unit I (Fig. 19). Since work at the site did not adequately sample all of the zones, they are designated from top to bottom, rather than following the customary geologic procedure of labeling from bottom to top. Thus, should there be further work at the site, new zones can easily be added to the sequence. The layers recognized are combined occupational and geologic strata, and include:

Zone A: The uppermost, humus-stained stratum was composed of friable, grayish-tan silt. It was most easily recognized by the numerous snail shells which occurred throughout. Cultural debris was found in fair quantities (this zone was the most productive zone excavated); hearthstones were present, but only as local concentrations. This zone ranged from 1.5 to perhaps as much as 4 feet in thickness. It was best represented in Unit III; it became less distinct and is only tentatively identified in Unit II. There is a possibility—suggested solely by the dart point

types found in Zone A, and hence difficult to establish—that this zone may be a secondary deposit resulting from clearing the roadway or from erosion of a higher and older deposit (see fuller discussion of this problem in the concluding section).

Zone B: This was a relatively sterile stratum consisting of a clean and compact, tan-colored, sandy silt. Artifacts were infrequent (a total of 15 were found), as were hearthstones and flint chips, which suggests that this zone probably represents a period when the site was virtually uninhabited. More uniform than the preceding stratum, Zone B ranged from 1.5 to 2.5 feet in thickness. It was quite distinct in Unit III, was less distinct but recognizable in Unit II, and was not identified in Unit I.

Zone C: This zone was moderately friable, gray-brown alluvium with a considerable amount of cultural detritus. The artifact yield, however, was somewhat less than Zone A. Hearthstones were numerous and sometimes occurred in aggregates suggestive of incipient burned-rock midden accumulations. Thickness of this zone ranged from 1.5 to 2 feet. It was easily identified in both Units II and III, but appears to have been absent in Unit I, although only one auger test reached a depth where it might have been encountered.

Zone D: Slightly darker and more compact than Zone C, this layer was encountered in the few deeper squares. It appeared, nonetheless, to have less cultural debris than Zone C. The thickness could not be accurately determined, but it is probably greater than two feet. It was best revealed in Unit II, but also seemed to be present in Unit III.

Since none of the four zones recognized can be identified with any certainty in Unit I, the relationships between the deposits in Unit I and those in units II and III are troublesome. Moreover, there are several possibilities, including: (1) that this portion of the site (Unit I) was on the periphery of the main concentration of occupation and, as a result, there was little or no accumulation of cultural debris—an interpretation supported to some extent by the relatively low artifact yield from Unit I. If this be the case, then it would seem that Zone A might be extended, becoming much thicker and somewhat different lithologically (because of light occupation?) to the north. Or, (2) that the excavation in Unit I was in quite distinct deposits, possibly representing an older terrace—perhaps Deussen's Terrace No. 2 (1924: 117). If this interpretation is correct, then materials from Unit I would correspond most closely to those from Zone C, as is faintly suggested by the common occurrence of dart point types *Darl* and *Edgewood*.

As important as these relationships are to an understanding of the sequence of occupations, it is regrettable that the geological and archeological evidence obtained from the excavation is too scant to establish conclusively either hypothesis. And even though these problems were recognized in the field, the nature of the site—particularly the removal of a critical portion of the fill in the roadway and suggestions of former erosion to the site—posed too many obstacles.

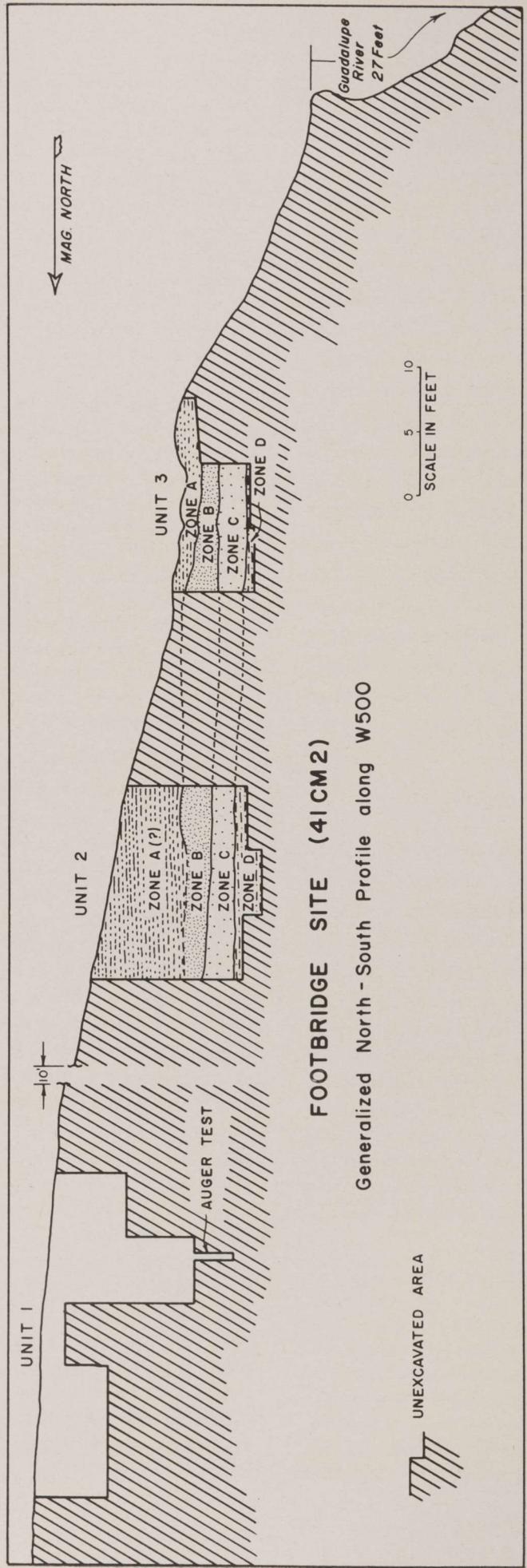


FIGURE 19.

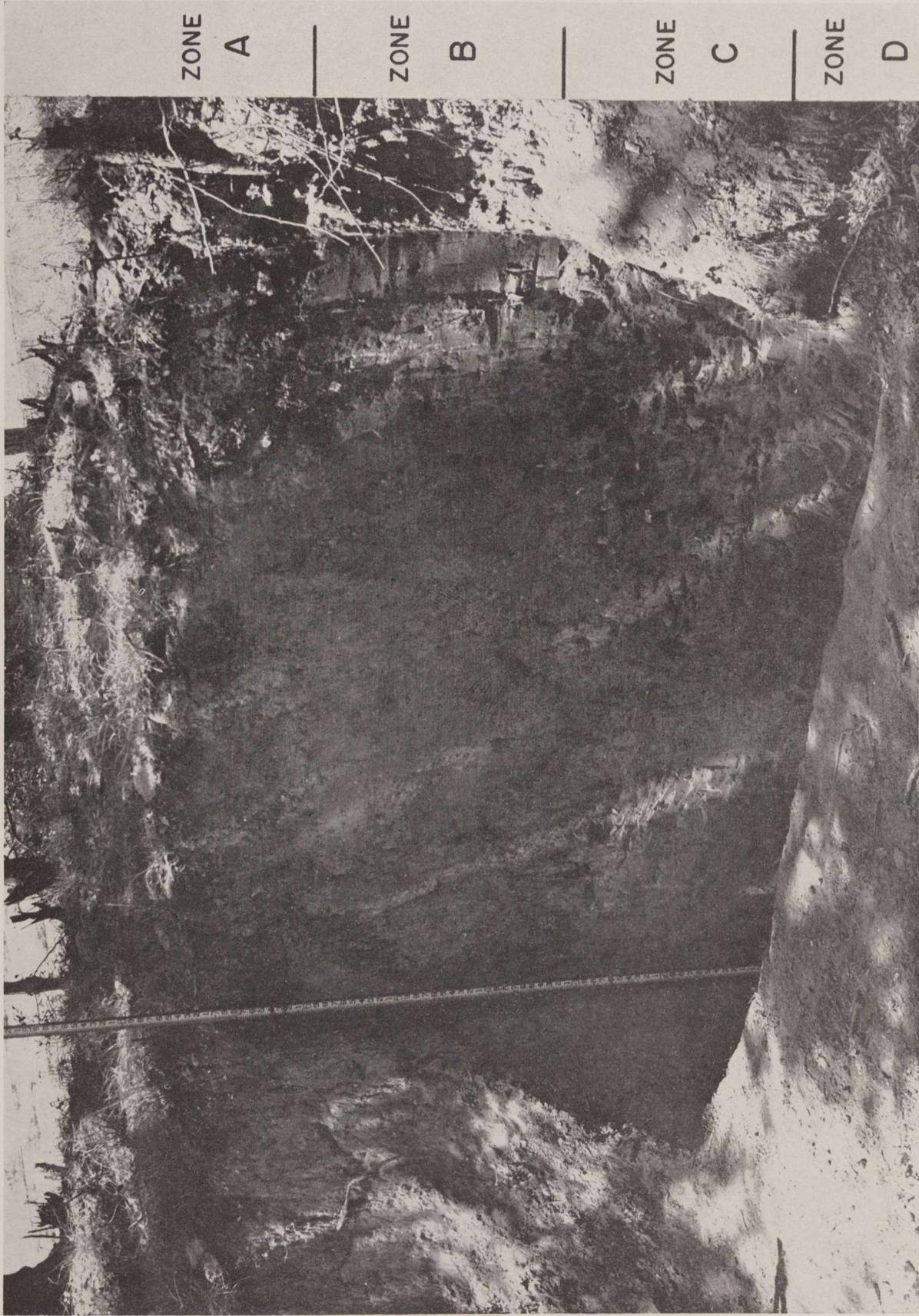


FIGURE 20. Zones recognized in the southern end of the Footbridge Site, in exploratory cut 2.

EXCAVATION OF THE SITE

Systematic investigation of the Footbridge site was carried out in a manner that has become fairly standard archeological procedure. The nature of the site, particularly the deep road cut into the alluvial deposits, facilitated the initial exploration and definition of the occupational zones. Two exploratory cuts were made into the west wall of the roadway (Fig. 18); the northernmost was designated as No. 1, the southernmost as No. 2. As soon as the structure of the site became more apparent, excavation was continued in terms of a grid laid out in five-foot squares. The grid was oriented with the cardinal directions, and excavations were conducted entirely within the northwest quadrant. A total of 16 squares was dug to depths varying from two to almost 12 feet below the surface. The squares excavated were concentrated in three somewhat separated areas. For convenience these are labeled, moving north to south, as excavation units I, II, and III.

All vertical depths were recorded relative to the datum, which was assigned an assumed elevation of 200 feet. Each square was dug by arbitrary six-inch levels and, whenever possible, the levels were related to cultural or geological zones. Once excavation of a square was completed, a detailed profile was made of at least one wall.

All material was screened and the specimens which were saved from each level were placed in an appropriately labeled paper bag. These were sent to the laboratory in Austin where they were later processed. In addition to the artifacts, various other materials were collected for special studies: charcoal and shell samples for C-14 dating; flint chips and cores for studying flint knapping techniques, faunal remains (bone and shell) for a reconstruction of the food habits and ecology; and soil samples for palynological and lithological analyses. Thus far, only the chipping debris and animal bones have been examined.

OCCUPATIONAL FEATURES

Occupational features recorded at the Footbridge Site are of two easily distinguished types: (1) remains of masonry structures and (2) accumulations of fire-fractured limestone. The former can definitely be identified as belonging to a recent—within the past 30–50 years—European occupation, as is evidenced by the nature of the structures and by the artifacts (bottle glass, iron nails, etc.) found about them. Specifically, these features include a corral of dry-laid unshaped limestone slabs, a probable house foundation of limestone slabs, and a stone wall (Fig. 18).

The accumulations of burned limestone fragments (Fig. 21) are associated with the prehistoric occupations. Fire-cracked limestone was found in all occupation zones, but these scattered occurrences are to be differentiated from the concentrated and apparently *in situ* accumulations.

Three such accumulations, designated as features 1 through 3, were recorded. They were similar in size, from three to four feet in diameter, and roughly circular in outline. They ranged from five to eight inches in total thickness. Each feature consisted of two or more layers of rock fragments laid down upon a flat surface (*i.e.*, none were basin-shaped). It seems probable that they were cooking hearths, although the soil about them did not evidence signs of burning, nor were more than a few flecks of charcoal present. Perhaps they had been leached out; certainly the rocks (usually about fist-sized) had been thermal fractured. In fact, it was possible to restore several slabs which had been broken by the heat. A few snail and mussel shells, and bits of bone were found near the hearths, but these appear to be fortuitous associations. Two of the hearths were found in Unit II, Zone C, and one was found just below the surface, Unit I.

THE ARTIFACTS

The total artifact yield from the site, 396 specimens (110 of which were from the surface), was rather disappointing, particularly since no one category was well represented (Table 2). In addition, there were large numbers of fragmentary specimens, many of which could only be sorted into broad groups.

The artifacts were initially separated into more or less functional categories, such as dart points, knives, scrapers, ground stone implements, etc. Within each of these categories various morphological and/or technological (technique of manufacture) subgroups were distinguished. The subgroups—especially the projectile points—were then



FIGURE 21. Feature 1. An accumulation of fire-cracked limestone.

compared with existing typologies and, whenever appropriate, identified with previously established types. In approaching the typology in this manner, an emphasis has been placed upon internal order and consistency of attributes over standard, sometimes inappropriately applied, sets of types.

Projectile Points

A total of 75 projectile points was recovered from the site. On the basis of differences in size these have been grouped into two categories: dart points and arrow points. The latter are usually smaller, and are consistently lighter in weight. It is assumed that they were hafted onto arrow shafts, while the dart points were presumably hafted onto light spears.

Dart Points

Dart points, represented by only 70 specimens, are not numerous in the collection from Footbridge. Of these, 51 are classified into 18 previously defined types, two are only tentatively identified as to type, three cannot be assigned to any presently recognized type, and 14 are too fragmentary for further identification. Although the definitions presented in *An Introductory Handbook of Texas Archaeology* (Suhm *et al.*, 1954) have been followed closely and apply fairly well, each type sample is described herein considerable detail. These particulars are presented in hopes that they will ultimately contribute to a more usable and meaningful dart point typology. There are, for example, indications that many types can be profitably subdivided into smaller groups, generally now being termed varieties (Epstein, 1960a; Johnson, 1961; Duffield, 1961). Unfortunately, the dart point sample for Footbridge is too inadequate to warrant the recognition of varieties. Nor can those already defined (Johnson and Tunnell, herein) be applied with much success to the Footbridge specimens.

BULVERDE (Fig. 22, E-G)

No. of specimens: 7 definite, and 3 stem fragments which probably belong to this type.

Form: Triangular blade with edges straight to convex. Blade of one specimen (Fig. 22, E) has shallow notches or serrations, a feature rarely reported for the *Bulverde* type. Shoulders fairly pronounced, sometimes barbed. Stem more or less rectangular, or slightly contracting. Bases straight (4) to faintly concave (3). Bases appear wedge-shaped in cross section.

Dimensions: Total length: 51 to 56 mm.; average: 54 mm. Maximum width (across shoulders): 25 to 35 mm.; average: 32 mm. Maximum thickness: 5 to 9 mm.; average: 7 mm. Stem length: 15 to 20 mm.; average: 18 mm. Maximum stem width: 16 to 19 mm.; average 17 mm.

Weight: 10.7 to 11 gm.

Material: Gray chert.

Workmanship: Percussion chipped, with broad and long flakes suggestive of the billet technique. Lateral edges of the blades and stem usually retouched. On the whole, somewhat better made than *Nolan* and *Travis* points.

Provenience: Surface (2); Unit I, 0-6 inch level (1); Unit II, Zone A? (1); Unit III, Zone A (3). The three stem fragments which may be *Bulverde* are all from Unit III, Zone A.

Remarks: Being represented by seven, possibly 10 specimens, *Bulverde* is the most common dart point type found at Footbridge. Its distribution is close to that noted for *Travis* and *Pedernales* points. None of the *Bulverde* from Footbridge can be related to the varieties recognized by Johnson (herein, pp. 19-21).

DARL (Fig. 22, A-D)

No. of specimens: 6

Form: Small triangular blade sometimes faintly serrated. Edges of blade straight or slightly convex. Shoulders pronounced, but not barbed. Stem is somewhat expanded with a straight to concave base.

Dimensions: Total length: 35 to ca. 60 mm. Maximum width (across shoulders): 17 to 20 mm.; average: 19 mm. Maximum thickness: 5 to 6 mm. Stem length: 7 to 11 mm.; average: 9 mm. Maximum stem width (across base): 14 to 17 mm. Depth of basal concavity: 1 to 3 mm.

Weight: 3.1 to 6.2 gm.; average 4.4 gm.

Material: Gray chert (4), tan chert (1), blue chert (1).

Workmanship: Generally well controlled percussion and pressure flaking. Marginal edges of the stem are not beveled, but they are steeply retouched on all sides and, as a result, the blade is markedly lenticular in cross section.

Provenience: Unit I, 18-24 inch zone (1), 42-48 inch zone (1); Unit II, Zone C (3); Unit III, Zone C (1).

Remarks: As a group the *Darl* points are small, well made and have rectangular or slightly expanding stems. However, there are suggestions of at least two subgroups, although the sample is too small to warrant formal variety definitions. The most common form (Fig. 22, C, D), represented by three, possibly four specimens, is long and slender, and has a fairly marked concave base. With one exception, these points occurred deep—in Zone C. The two straight base forms (Fig. 22, A, B) were widely distributed: one was found in the upper levels of Unit I, the other in Zone C, Unit III.

EDGEWOOD (Fig. 25, G)

No. of specimens: 3

Form: Small, squat points with triangular blades. The blade edges are slightly convex and terminate in long barbs. The distal ends of two specimens are needle-like; one of these has been rechipped, the other appears to have been originally that form. The base is expanded (diagonal corner-notched), and is slightly concave.

Dimensions: Total length: 26 to 30 mm.; average: 28 mm. Average maximum width (across shoulders): 29 mm. Maximum thickness: 4 to 6 mm.; average: 5 mm. Stem length: 6 to 8 mm. Maximum stem width (across base): 15 to 20

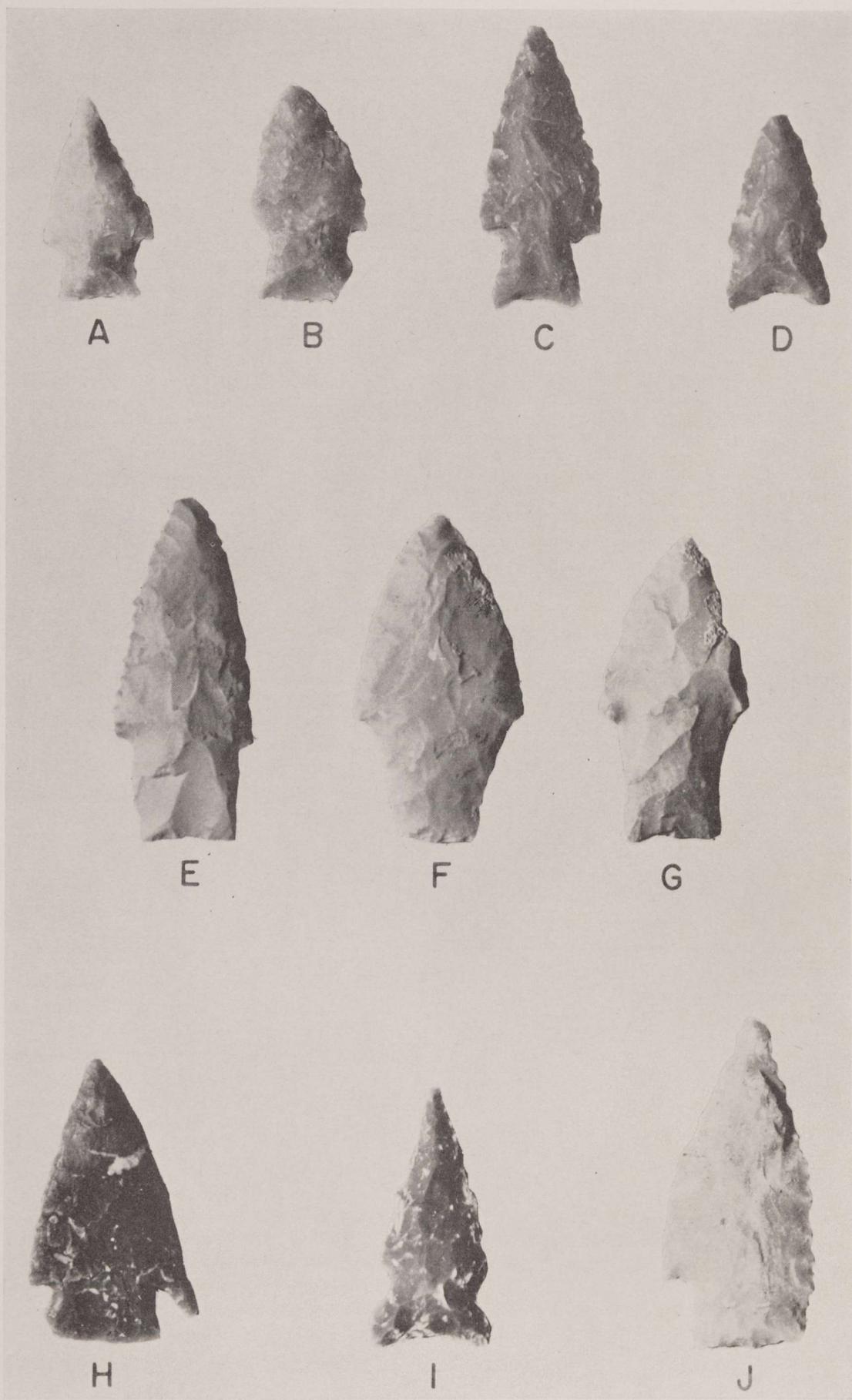


FIGURE 22. Dart Points. A-D, Darl. E-G, Bulverde. H-J, Unclassified.

mm.; average: 18 mm. Depth of basal concavity: 1 to 2 mm.
Weight: 2.6 to 3 gm.

Material: Blue flint (1), tan chert (2).

Workmanship: Percussion chipping with extensive marginal retouching.

Provenience: Surface (1); Unit I, 60–66 inch zone (1); Unit II, Zone D (1).

Remarks: One, possibly two, is rechipped. Nonetheless, as a group they are linked by their small size and similar outlines. They are differentiated from *Ellis* and *Ensor* primarily on the basis of the concave base.

ELLIS (Fig. 25, H)

No. of specimens: 1

Form: Small triangular blade with straight edges. Blade has faint suggestions of a bevel. Stem, formed by corner notches, is broad and expanding. Shoulders are prominent, but not barbed. Base is straight.

Dimensions: Total length: 34 mm. Maximum width (across shoulders): 22 mm. Maximum thickness: 5 mm. Stem length: 18 mm. Maximum width of stem: 20 mm.

Weight: 4.3 gm.

Material: Gray chert.

Workmanship: Rather poor percussion chipping, some of which may have occurred accidentally, after the specimen was discarded or lost. Marginal edges of blade are retouched.

Provenience: Unit I, 54–60 inch zone.

Remarks: Distinguished from *Ensor* solely on the basis of the extent to which the stem expands—the one *Ensor* point from Footbridge is more expanded.

ENSOR (Fig. 25, I)

No. of specimens: 1

Form: Broad triangular blade with slightly convex edges. Shoulders moderately barbed. The short and markedly expanded stem is produced by diagonal corner notches. The base is straight.

Dimensions: Total length (tip of blade missing): ca. 40 mm. Maximum width (across shoulders and base of stem): 29 mm. Maximum thickness: 5 mm. Stem length: 6 mm.

Weight: Too incomplete to be determined.

Material: Tan chert.

Workmanship: Percussion chipping with extensive pressure flaking along the marginal edges.

Provenience: Unit I, 48–54 inch zone.

Remarks: Typologically *Ensor* is similar to *Edgewood* and *Ellis*; however, it lacks the concave base of *Edgewood* and the stem expands more than *Ellis*. The one *Ensor* from the Footbridge Site corresponds to Tunnell's (p. 90) *Ensor*, Variety F, from the Oblate Site.

FAIRLAND (Fig. 23, A, B)

No. of specimens: 2

Form: Small triangular blade with straight edges. Shoulders well defined, but not barbed. Stem is strongly expanded and the edges of the base are nearly flush with the shoulders. The

basal concavity is broad and shallow, producing sharply pointed corners.

Dimensions: Total length (blade of only one specimen complete): 37 mm. Maximum width (across shoulders): 24 and 27 mm. Maximum thickness: 4 and 5 mm. Stem length: 11 and 12 mm. Maximum stem width: 23 and 27 mm. Depth of basal concavity: 3 and 4 mm.

Weight: 5.3 gm.

Material: Gray and tan chert.

Workmanship: Skillful (billet?) percussion flaking with some pressure chipping along marginal edges. Base thinned by the removal of several long, slender flakes.

Provenience: Surface and excavation Unit I, 18 to 24 inches below the surface.

Remarks: Typologically, *Fairland* is similar to *Edgewood*, but is distinguished from *Edgewood* on the basis of the sharply pointed corners of the base. At the Footbridge Site scant evidence suggests that *Fairland* may be temporally linked with *Ensor*, *Edgewood*, and *Ellis*. At the Oblate Site, Tunnell (p. 90) identified somewhat similar points as *Ensor*, Variety E.

FRIO (Fig. 24, A)

No. of specimens: 1

Form: A large triangular blade with prominent, barbed shoulders. Edges of the blade are straight. The stem is markedly expanding and formed by deep, diagonal corner notches. The base is straight with a pronounced U-shaped notch.

Dimensions: Total length: too incomplete to determine. Maximum width (across shoulders): ca. 39 mm. Maximum thickness: 6 mm. Stem length: 10 mm. Maximum stem width: 33 mm. Depth of basal concavity: 5 mm.

Weight: Too incomplete to be determined.

Material: Gray chert.

Workmanship: On the whole, well controlled percussion flaking. Secondary pressure retouching along marginal edges.

Provenience: Unit II, upper portion of Zone B.

Remarks: This point differs slightly from those illustrated in the Handbook (Suhm *et al.*; 1954, Pl. 93) in that the lateral edges of the base are not recurved. The recurring seems to result from notching a strongly convex base, rather than a straight one. Tunnell (herein, pp. 88–90) prefers to call somewhat similar points from the Oblate Site a variety (C) of *Ensor*. However, the one clearly recognizable *Ensor* point found at Footbridge may belong to a different occupation. Moreover, without the basal notch, this specimen would—by virtue of its size and corner-notching—appear closer to *Marcos* than to *Ensor*.

LANGE (Fig. 23, H, I)

No. of specimens: 5

Form: Generally large points with triangular blades. Blade edges straight to slightly convex. Shoulders pronounced but not usually barbed. Stem expands and edges of the stem are concave. Bases are straight or faintly concave.

Dimensions: Total length: most blades are broken, but range

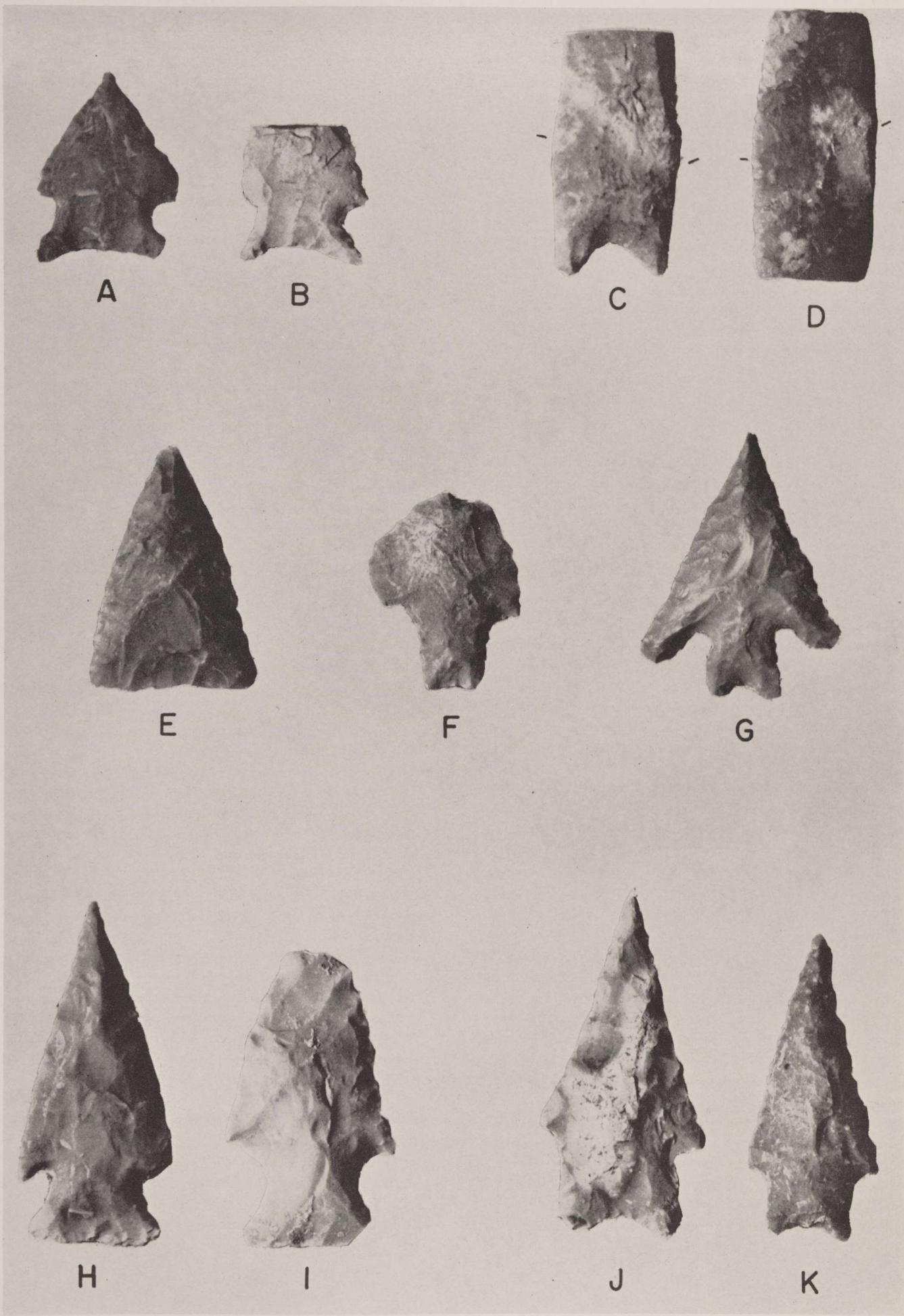


FIGURE 23. Dart Points. A, B, *Fairland*. C, *Meserve*. D, Unidentified. E, *Tortugas*. F, *Langtry*. G, *Shumla?*
H, I, *Lange*. J, K, *Pedernales*. All specimens natural size.

approximately 55 to 80 mm.; average: about 65 mm. Maximum width (across shoulders): 20 to 37 mm.; average: 29 mm. Maximum thickness: 7 to 9 mm. Stem length: 14 to 17 mm.; average: 15 mm. Maximum stem width (across base): 19 to 29 mm.; average 22 mm.

Weight: (nearly complete) 12.8 gm.

Material: Tan and gray cherts.

Workmanship: Generally very crude percussion chipping. Surface covered with deep, irregular flake scars and humps. Marginal edges show some retouching, but it too is crude.

Provenience: Unit I, 42-48 inch zone (1); Unit II, Zone C (1); Unit III, Zone A (1), Zone C (2).

Remarks: In general these points seem within the range previously defined for *Lange* (Suhm *et al.*, 1954: 436). However, they exhibit poor workmanship and considerable variation in size.

LANGTRY (Fig. 23, F)

No. of specimens: 1

Form: A small point with a triangular blade. Edges of blade slightly convex. Shoulders prominent, but not barbed. Stem long, slender and contracting. Base has a shallow concavity.

Dimensions: Total length (specimen rechipped): 34 mm. Maximum width (across shoulders): 30 mm. Maximum thickness: 5 mm. Stem length: 15 mm. Maximum stem width (just below shoulders): 14 mm.

Weight: Too incomplete to be determined.

Material: Gray chert.

Workmanship: Largely percussion chipped, with fine marginal retouching. On the whole, this point is thin and well made.

Provenience: Unit I, 54-60 inch zone.

Remarks: The rechipping has produced a blunt end, probably for secondary use as a knife rather than as a piercing instrument. *Langtry* occasionally occurs in central Texas and was found at the nearby Wunderlich Site (Johnson, herein), but the center of distribution lies to the west, in the Trans-Pecos region. Since the Footbridge specimen is of local chert, a diffusion of the style rather than the point itself, is indicated. Another common Trans-Pecos dart point style, *Shumla*, is tentatively identified at Footbridge.

MARSHALL (Fig. 24, B)

No. of specimens: 1

Form: Large triangular blade with long massive barbs which extend almost to the base of the stem. Edges of the blade are straight. The stem is short and expands slightly. The base is slightly concave.

Dimensions: Total length: 60 mm. Maximum width (across base of barbs): 36 mm. Maximum thickness: 5 mm. Length of stem: 9 mm. Maximum width of stem: 15 mm. Depth of basal concavity: less than 1 mm.

Weight: (nearly complete) 10.6 gm.

Material: Tan chert.

Workmanship: A thin, well made point. Since all flake scars are shallow and vary from broad to narrow, billet flaking seems indicated. Limited secondary retouching is in evidence along the marginal edges.

Provenience: Unit II, Zone D.

Remarks: Well within the range previously described for *Marshall* (Suhm *et al.*, 1954: 444).

MARTINDALE (Fig. 24, C)

No. of specimens: 1

Form: Triangular blade with convex blade edges and barbed shoulders. Stem is strongly expanding (diagonal corner notching), and base is concave. The basal concavity, however, is not V-shaped.

Dimensions: Total length: 46 mm. Maximum width (across shoulders): 27 mm. Maximum thickness: 6 mm. Stem length: 9 mm. Maximum stem width: 2 mm.

Weight: (nearly complete) 6.9 gm.

Material: Tan chert.

Workmanship: Fairly well controlled percussion flaking with some pressure chipping along marginal edges. Impurities in the material, however, seem to have impaired chipping.

Provenience: Excavation Unit II, Zone D.

Remarks: Since this specimen lacks the distinctive V-shaped basal concavity, it is only tentatively identified as *Martindale*. On the other hand, the overall size of the point, the blade form and expansion of the stem are well within the range of *Martindale*. In this connection it is significant to note that the basal concavity is somewhat battered and portions of the basal notch may have been obliterated.

MESERVE (Fig. 23, C)

No. of specimens: 1

Form: A lanceolate-shaped point with alternately beveled blade (to the right). Stem, distinguished only by lateral smoothing of the edges and beginning of the bevel, has parallel sides and a deeply indented base.

Dimensions: Total length: Undetermined, as approximately half of the blade is missing. Maximum width: 25 mm. Maximum thickness: 5 mm. Length of stem (*i.e.* extent of basal smoothing): 23 mm. Depth of basal concavity: 6 mm.

Weight: Too incomplete to be determined.

Material: Gray chert.

Workmanship: Well chipped with obliquely parallel flake scars predominating. Marginal edges have fine retouching.

Provenience: Unit III, Zone A.

Remarks: The size of this point, coupled with the workmanship suggests that it was not rechipped from a *Plainview* point. In addition to this specimen, there are two other point fragments from Footbridge which are suggestive of early forms. Both, unfortunately, are too incomplete for positive identification: one is an indented base fragment and has smoothing along the lateral edges; the other (Fig. 23, D) is a handsomely chipped (oblique flaking) blade fragment (both the tip and stem are missing) with traces of lateral smoothing along the presumed proximal end. The indented base fragment was found near the *Meserve* point (Unit III, Zone A), and the blade fragment was recovered in Unit II, Zone C. Both have been tabulated in Table 2 as unidentifiable point fragments because the features they exhibit (basal smooth-

ing and oblique flaking) are not restricted to Early Man points.

NOLAN (Fig. 24, I, J)

No. of specimens: 5

Form: Triangular blade with weak, generally rounded shoulders. Stem rectangular with a tendency to flare slightly. Base straight to faintly convex. Most distinctive feature is the alternately beveled (to the right) stem.

Dimensions: Total length: 37 to 80 mm.; average: 55 mm. (smallest specimen, Fig. 24, I, is rechipped). Maximum width (across shoulders): 21 to 28 mm.; average: 25 mm. Maximum thickness: 7 to 9 mm. Stem length: 16 to 28 mm.; average: 21 mm. Maximum stem width: 17 mm. to 23 mm.; average: 20 mm.

Weight: 6.3 (rechipped) to 16.5 gm.

Material: Gray chert (2), brown chert (2), heavily patinated (1).

Workmanship: Poor percussion chipping predominates, although one specimen has some evidence of billet flaking. Marginal edges of blade sometimes retouched; beveled stems on all specimens show secondary retouching.

Provenience: Unit I, 0-6 inch zone (1), 48-54 inch zone (1), 54-60 inch zone (1), 108-114 inch zone (1); Unit II, Zone A? (1).

Remarks: Distinguished from *Travis* solely on the basis of the beveled stem. Although the sample is quite small, *Nolan* tended to occur in the northern portion of the site (largely Unit I), while *Travis* and *Bulverde* tended to occur in the southern portion of the site (units II and III).

PEDERNALES (Fig. 23, J, K)

No. of specimens: 6

Form: Triangular blade with straight to convex edges. Shoulders prominent, but not barbed. Stem rectangular with a tendency toward faintly convex lateral edges. Base deeply notched (3), or has broad and shallow concavities (2). Stem wedge-shaped in cross section.

Dimensions: Total length: 60 to 62 mm.; average: 61 mm. Maximum width (across shoulders): 23 to 32 mm.; average: 26 mm. Maximum thickness: 8 to 9 mm. Stem length: 12 to 20 mm.; average: 16 mm. Stem width: 17 to 23 mm.; average: 19 mm. Depth of basal indentation: 3 to 9 mm.; average: 5 mm.

Weight: 9.5 to 11.6 gm.

Material: Gray and tan chert.

Workmanship: Rather poor percussion chipping with some marginal retouching. Most of the specimens appear medially thick in cross section, apparently due to poor chipping which failed to remove long flakes from the flat surfaces.

Provenience: Surface (1); Unit II, Zone A? (2), Zone B (1), Zone C (2).

Remarks: Although typologically well within the range of *Pedernales* (Suhm et al., 1954: 468), none of these points is a good representative of the type; nor can they be related specifically with the varieties of *Pedernales* recognized herein

by Johnson and Tunnell. In terms of distribution, the five points found in place were clustered in the southern portion of the site. This meager evidence suggests that it may be linked with *Bulverde* and *Travis*. The sequence of *Nolan* preceding *Pedernales*—so clearly in evidence at the Crumley Site (Kelly, 1961) and strongly suggested at Wunderlich (Johnson, herein)—cannot be demonstrated at Footbridge. In fact, *Pedernales* was generally more deeply buried than *Nolan*. However, since the sample is so small and there is a possibility of disturbance to Zone A, little significance can be attached to this distribution.

SHUMLA ? (Fig. 23, G)

No. of specimens: 1

Form: Broad, triangular blade with long, laterally expanding barbs. Blade edges are concave and terminate in pronounced barbs. Stem is roughly rectangular with a deep basal indentation.

Dimensions: Total length: 51 mm. Maximum width (across base of barbs): 35 mm. Maximum thickness: 7 mm. Stem length: 17 mm. Stem width: 15 mm. Depth of basal concavity: 4 mm.

Weight: 8.2 gm.

Material: Tan chert.

Workmanship: Largely well controlled percussion chipping with pressure retouching along marginal edges. Distal end terminates in a needle-like point produced by fine pressure chipping.

Provenience: Unit II, Zone C.

Remarks: This point resembles *Shumla* largely because of the long, outwardly flaring barbs. The stem, on the other hand, is aberrant for *Shumla* and even resembles, to some extent, *Pedernales* points. A positive identification with *Shumla*, therefore, is unwarranted.

TORTUGAS (Fig. 23, E)

No. of specimens: 3

Form: Triangular with straight to faintly convex blade edges. Base varies from straight to slightly convex. Blade edges on all specimens are beveled to the right. The bases are thinned, usually by the removal of several broad and shallow (billet?) flakes.

Dimensions: Total length: 34 to 46 mm.; average: 41 mm. Maximum width (across the base): 30 to 32 mm. Maximum thickness: 5 to 8 mm.; average: 6 mm.

Weight: 4.4 to 10.8 gm.; average: 7.4 gm.

Material: Gray chert (2), tan chert (1).

Workmanship: Well controlled percussion chipping with a number of broad and shallow flake scars. Marginal edges appear to have been pressure retouched.

Provenience: Surface (2) and Unit II, Zone C (1).

TRAVIS (Fig. 24, G, H)

No. of specimens: 3

Form: Long, slender point with a lanceolate blade. Lateral

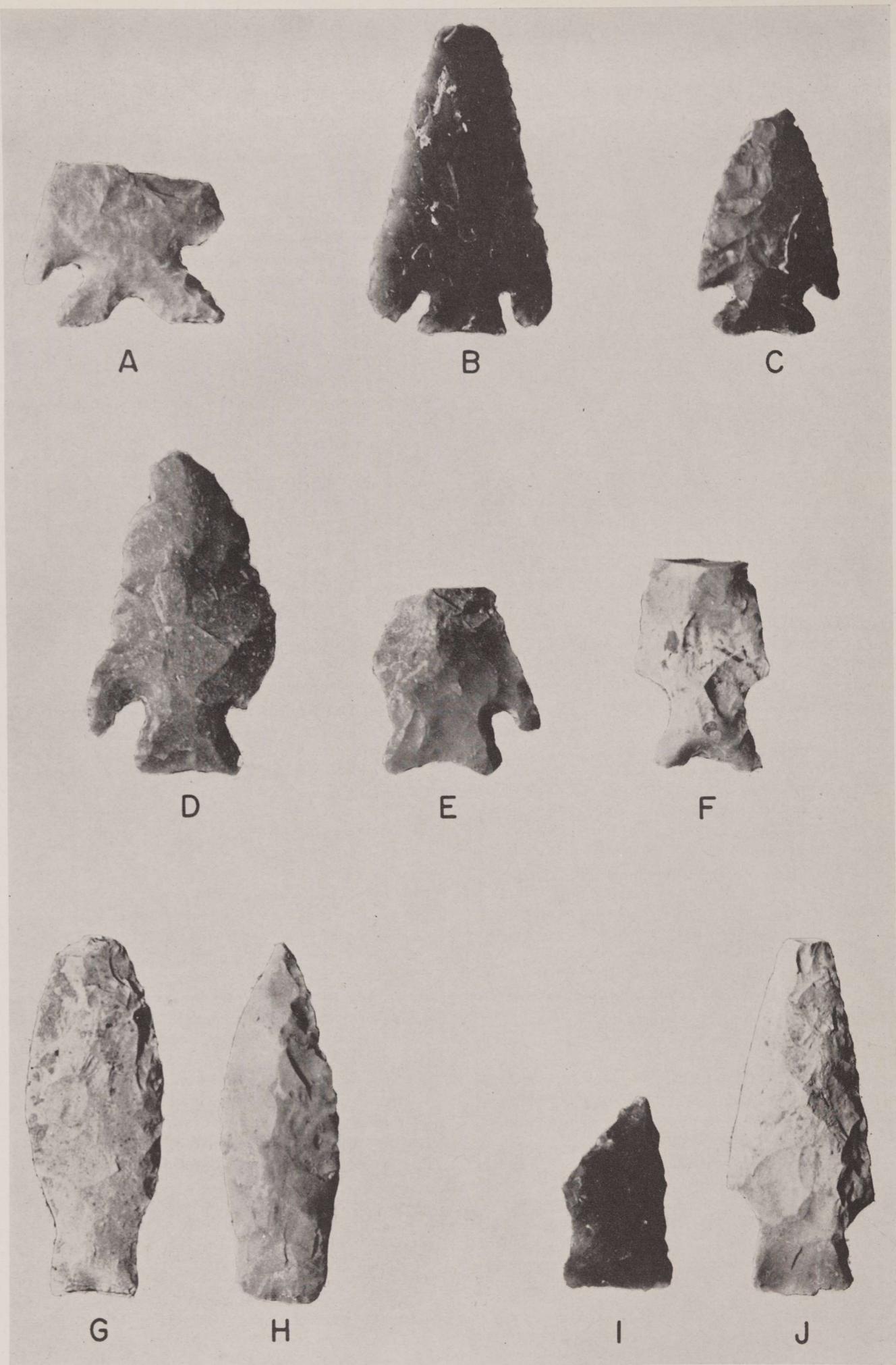


FIGURE 24. Dari Points. A, Frio. B, Marshall. C, Martindale. D-F, Uvalde. G, H, Travis. I, J, Nolan.
All specimens natural size.

edges of blade convex. Shoulders virtually absent on two specimens, slight and well rounded on the third. Stem rectangular and base varies from slightly concave to faintly convex.

Dimensions: (only one complete) Total length: 70 mm. Maximum width (across the shoulders): 21 mm. Maximum thickness: 7 to 9 mm. Stem length: 20 mm. Maximum stem width (across the base): 18 mm.

Weight: 13.9 gm.

Material: Gray chert; two heavily patinated.

Workmanship: Rather crude percussion chipping with limited marginal retouching.

Provenience: Unit II, Zone A? (1); Unit III, Zone A (2).

Remarks: In outline form *Travis* is very close to *Nolan*, the latter's beveled stem being the only basis for separation. At Footbridge, *Travis* also tended to intergrade with *Bulverde*, and was distinguished from the latter by its less pronounced shoulders and more lanceolate-shaped blade.

UVALDE (Fig. 24, D-F)

No. of specimens: 5

Form: Rather large and generally broad triangular blade with prominent shoulders (2), sometimes barbed (3). Edges of blade straight to slightly convex. Stem is expanding and base is concave.

Dimensions: Total length: none complete, but range probably between 55 and 70 mm. Maximum width (across the shoulders or base of barbs): 28 to 44 mm.; average: 35 mm. Maximum thickness: 7 to 9 mm. Length of stem: 12 to 15 mm. Maximum width of stem: 20 to 25 mm.; average: 22 mm. Depth of basal concavity: 1 to 4 mm.

Weight: None is complete enough to determine accurately, but greater than 15 grams.

Material: Gray chert (4), tan chert (1).

Workmanship: Generally poor; deep and narrow flake scars are frequent. Only two have marginal retouching.

Provenience: All from Unit II, Zone C.

Remarks: Most distinctive features of the *Uvalde* type are its expanded stem and concave base.

UNCLASSIFIED I (Fig. 22, H)

No. of specimens: 1

Form: Triangular blade with straight edges and one long barb (opposite edge presumably rechipped). Stem is expanded and base is straight.

Dimensions: Total length: 48 mm. Maximum width: 28 mm. Maximum thickness: 5 mm. Length of stem: 11 mm. Maximum width of stem: 20 mm.

Weight: 6.9 gm.

Material: Dark gray chert.

Workmanship: Well made with suggestions of billet flaking (*i.e.*, broad, shallow scars). Marginal edges neatly retouched. One lateral edge appears to have been rechipped.

Provenience: Unit I, 54–60 inch zone.

Remarks: In some respects—namely, the relatively small size and expanded stem—this point is similar to the *Ellis* type.

However, the barbs seem too prominent and the stem too short for *Ellis*.

UNCLASSIFIED II (Fig. 22, J)

No. of specimens: 1

Form: Triangular blade with a faint barb on one edge and a barbless shoulder along the other edge (has clearly been rechipped). Stem rectangular with a straight base.

Dimensions: Total length: 55 mm. Maximum width: 22 mm. Maximum thickness: 7 mm. Length of stem: 10 mm. Width of stem: 19 mm.

Weight: 10.2 gm.

Material: Gray chert.

Workmanship: Rather poor percussion chipping, although one surface has a long channel flake which may have been detached by means of a billet.

Provenience: Unit I, 0–6 inch zone.

Remarks: It is possible that this specimen was rechipped from a *Lange* or *Castroville* point.

UNCLASSIFIED III (Fig. 22, I)

No. of specimens: 1

Form: Essentially a triangular point with two rather shallow side notches and a concave base. Lateral edges of the blade are straight.

Dimensions: Total length: 45 mm. Maximum width (across the base of the stem): 22 mm. Maximum thickness: 9 mm. Length of stem: 12 mm. Depth of basal concavity: 3 mm.

Weight: 5.5 gm.

Material: Blue chert; all edges, but not the flat surfaces, are heavily patinated.

Workmanship: Poor percussion chipping; marginal retouching absent.

Remarks: Most closely resembles *Ensor* points (Suhm *et al.*, 1954: 422), but it has not been identified as *Ensor* primarily because of the concave base. Tunnell (herein, p. 90), however, has expanded the definition of *Ensor* and included similar points in his Variety D.

Arrow Points

Only five arrow points—unidentified (1) and types *Perdiz* (1), *Scallorn* (1), and *Granbury* (2)—were recovered. All are incomplete. One was found on the surface; the remainder are from the upper levels of Unit I.

The *Scallorn* point (Fig. 25, B) has a markedly expanded stem, almost flush with the blade edges, and an essentially straight base. It corresponds to Tunnell's Variety A (p. 98) and to Jelks' (1962: 30) *sattler* variety. The total length is approximately 35 mm.; maximum width (across the shoulders) is 17 mm. It was produced by fine pressure flaking. The *Perdiz* (Fig. 25, C) is more fragmentary. It is also pressure flaked, but exhibits somewhat cruder workmanship with one side being scarcely altered. The stem is long (11 mm.) and tapers slightly.

The shoulders are well barbed. This point appears to be equivalent to Tunnell's *Perdiz*, Variety B (pp. 96-98). The two *Granbury* points (Fig. 25, D, E) are triangular in outline and have convex blade edges and bases. Both are identifiable as Jelks' (1962: 36) *joshua* variety.

The one unidentified arrow point (Fig. 25, F) is also triangular in outline, but it has straight lateral edges and is somewhat better made than the *Granbury* points. The base is straight. Although similar to the *Fresno* type, this point deviates enough in size (it was at least 40 mm. long) and in outline to be considered as distinct.

Blade Fragments

A total of 88 unidentifiable blade fragments—largely distal ends—were recovered. These have been tabulated separately because of the difficulty in distinguishing, with any confidence, between dart point and knife blade fragments. Certainly both are represented in this group. Fragments clearly recognizable as dart points (*i.e.*, those having portions of the stem) are, however, listed separately (see Table 2).

Knives

The 31 recognizable knives from Footbridge are, in general, rather crude, percussion chipped, bifacial artifacts. They are considerably larger and heavier than the dart points. On the other hand, they are somewhat thinner and better made than the bifacial blades (see below). On the basis of outline form, the following descriptive groups are distinguished:

Triangular Knife (Fig. 26, G). Only one knife has a triangular outline. It is large, measuring 109 mm. long, 56 mm. wide across the base, and 15 mm. thick. The lateral edges are convex and the base is more or less straight. Large, broad flake scars, suggestive of the billet technique, cover both flat surfaces. There is no marginal retouching.

Stemmed Knives (Fig. 26, B). Four knives have definite shoulders and broad rectangular stems. These stems do not, however, duplicate those of the dart points; consequently, it does not seem likely that they are merely unfinished projectile points. All are crudely chipped, despite some suggestions of billet flaking, and two are exceedingly thick (as much as 20 mm.). The two complete specimens measure 65 and 84 mm. in length, and 36 and 48 mm. across the shoulders. One complete specimen (Fig. 26, B) terminates in a blunt distal end; the other complete specimen, however, has a distinctly pointed distal end. These four knives are distinguished from the lanceolate knives (below) by their clearly defined shoulders.

Lanceolate Knives (Fig. 26, C, D). The bases of four knives contract, giving them a lanceolate outline. Two

are long and slender, with maximum widths of 30 and 35 mm., and lengths of 100 and 105 mm. In general, these two are better made than the two broad lanceolate knives. The latter are 40 and 46 mm. in width and 90 and 110 mm. in length. Bases of the slender forms are straight; both broader specimens have concave bases.

Rectangular Knives (Fig. 26, E, F). Eleven specimens, most numerous of the knife forms, are rectangular in outline. The lateral edges, although slightly convex, are parallel for a considerable distance toward the distal ends. They vary from slender (28 mm. in width) to broad (55 mm. in width). Bases are either straight (16 specimens) or convex (5). A considerable variation in workmanship is exhibited: very poor and crude chipping to well controlled billet flaking.

Oval Knives (Fig. 26, A). These knives, represented by one complete specimen and four fragmentary ones, have broad, convex bases which taper toward the distal ends. The lateral edges in all cases are convex. They range in maximum width from 32 to 65 mm., and the one complete example is 76 mm. long. By and large they are thin (maximum thickness is 12 mm.) and well made.

Asymmetrical Knives (Fig. 26, H). Similar to the oval-shaped knives, these six specimens have convex bases and one more or less straight lateral edge opposed by a convex lateral edge. In outline form they are asymmetrically oval. Workmanship is, on the whole, poor and contrasts markedly with that of the oval knives. In size they are fairly uniform, with the average specimen measuring 85 mm. long, 44 mm. wide across the base, and 15 mm. thick.

Heavy Bifacial Tools (Fig. 26, I)

Twenty-eight chipped stone artifacts can be characterized as massive, roughly fashioned blades or bifacials. Crudely percussion chipped, they are most frequently made from initial flakes, or from large secondary flakes lacking any trace of the cortex. Less commonly (as in the case of three specimens), they are made from relatively thin, flat nodules or cores—apparently selected because their natural shapes and sizes required only limited modification. A portion of the nodule cortex is retained on both flat surfaces of this latter group. In outline shape, the majority of the bifaces are ovoid, although the entire range includes a few circular and subtriangular forms. A typical specimen measures 115 mm. long, 60 mm. wide, and 29 mm. thick. In virtually all dimensions they considerably exceed the more carefully manufactured knives.

Gouges (Fig. 27, H, H¹, K, K¹)

The nine gouges from Footbridge are long, slender artifacts which have as their most distinctive feature a steep

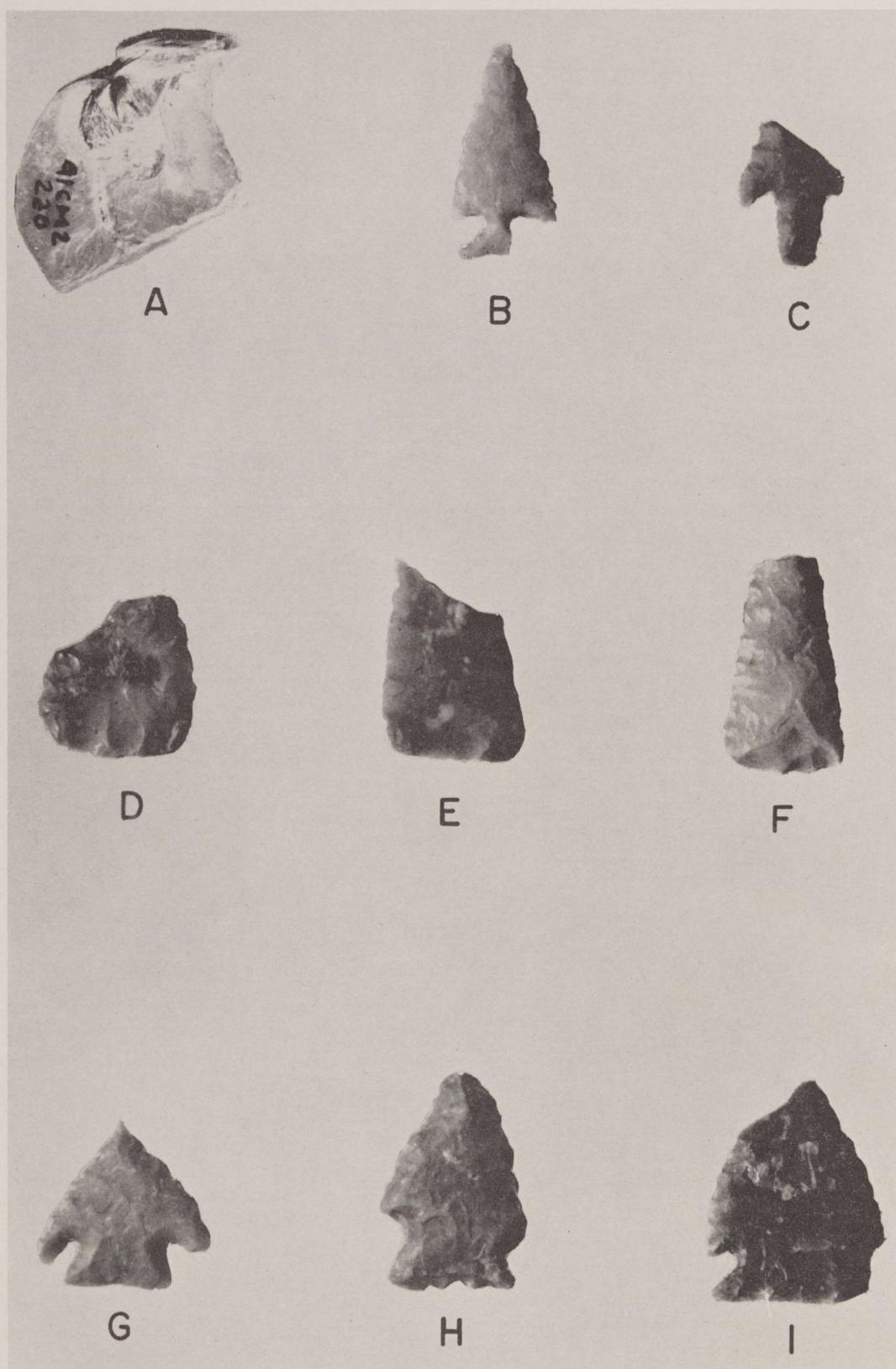


FIGURE 25. Arrow and Dart Points, Worked Shell. A, Worked mussel shell B, Scallorn. C, Perdiz. D, E, Granbury, joshua variety. F, Unidentified arrow point. G, Edgewood. H, Ellis. I, Ensor. All specimens natural size.

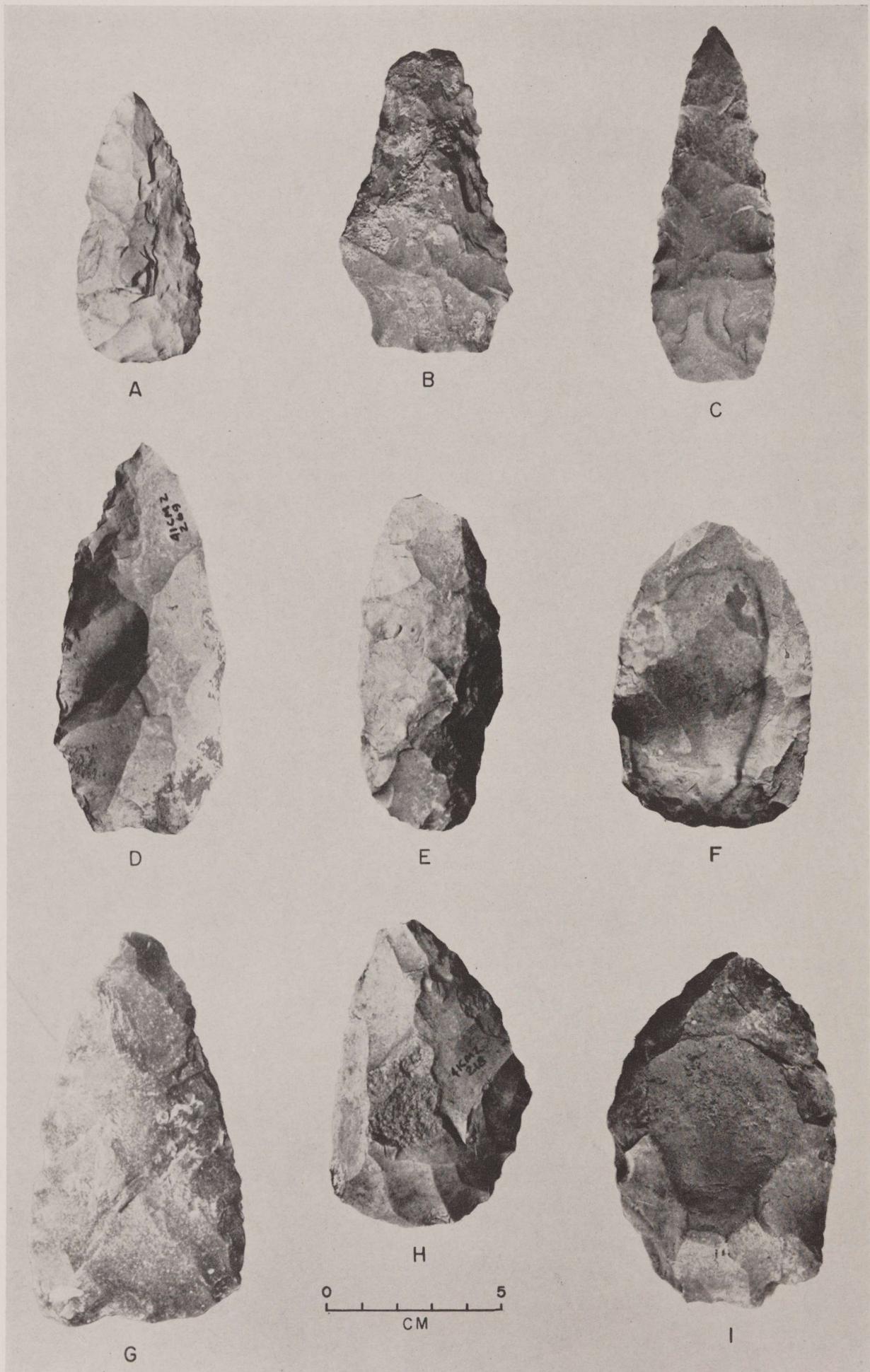


FIGURE 26. Knives and Heavy Biface. A, Oval knife. B, Stemmed knife. C, D, Lanceolate knives. E, F, Rectangular knives. G, Triangular knife. H, Asymmetrical knife. I, Heavy biface.

bit or scraping edge on the distal end. The opposite, or proximal end, is tapered. The bits, which vary from concave to convex, have been produced by the removal of one or several large flakes. Bifacial chipping, however, readily distinguishes these gouges from scrapers. All, with one exception, are biconvex in cross section. Average dimensions are 85 mm. long, 35 mm. wide (across the midsection) and 20 mm. thick. The bits vary in height from 10 to 15 mm.

Scrapers

Artifacts classed as scrapers are characteristically unifacially chipped stone tools. In almost all cases, the chipping is confined to the marginal edges; removal of long flakes across a flat surface is rare, but does occur on a few better made specimens. Six scrapers, because they are made from cores, are described in a separate section. The remainder, numbering 84 specimens, are described here as flake tools.

Various groups of flake scrapers can be recognized, either on the basis of the techniques of manufacture (Epstein, 1960a: 20-33; Johnson, 1961: 277-8; Honea, ms.), or on the basis of outline form and/or locus of the scraping edge (*e.g.*, snubnose, side, end, etc.). In analyzing the specimens from Footbridge, an emphasis has been placed on the manner in which they were made, following essentially the classification and definitions proposed by Epstein (1960a). Specifically, the following groups are recognized: (1) initial cortex flake scrapers, (2) cortex flake scrapers, and (3) secondary flake scrapers.

Initial Cortex Flake Scrapers (Figs. 27, M, N; 28, E). Represented by 33 specimens, these crude unifacially worked scrapers are fashioned from the initial or outermost flakes detached from chert nodules. They constitute the most common type of scraper found at Footbridge. Almost all are plano-convex in cross section, with the convex or "outside" surface retaining large portions of the cortex. Most, but not all, were struck from cores with prepared striking platforms.* Moreover, the visible flake scars suggest that this initial blow was delivered by a hammerstone. In producing, or, at least in selecting, an initial cortex flake there was a slight preference for end flakes. Initial flakes were made into scraping tools by generally crude percussion chipping along one or more edges. In outline shape they are quite variable, ranging from oval to rectangular to irregular, and no intentional shaping is evident. Likewise there is considerable variation in size, with maximum diameters or lengths of 30 to 100 mm.

* The present definition of initial cortex flakes, since it includes flakes with prepared striking platforms, represents an extension of Epstein's (1960a: 32) original usage.

Although subgroups within the initial cortex scrapers are difficult to recognize and tend to intergrade, the following varieties can be noted: (1) small (less than 50 mm. in diameter) initial flakes with chipping along only one edge (14 specimens); (2) large (greater than 50 mm. in diameter) initial flakes with chipping along only one edge (six specimens); (3) small to medium-sized initial flakes with marginal chipping along two or more edges (13 specimens). Side scrapers predominate in all three groups, which may explain the preference for the long end flakes.

Cortex Flake Scrapers (Fig. 27, I, J, L). Twenty-four cortex flake scrapers were found at the Footbridge Site. They are derived from chert nodules after the removal of the initial flake and, therefore have a positive bulb of percussion on one face and a negative bulb on the other. All, however, still retain portions of the cortex. Like the initial flake scrapers, none is intentionally shaped. In general, they vary in outline from oval to irregular. The majority have prepared striking platforms. Specifically, the nature of the flake scars suggests that most of these flakes were detached from cores by means of a hammerstone. They are somewhat less variable in size than the initial cortex flake scrapers, the average diameter or length being about 55 mm. Scraping edges were produced by percussion flaking. Eight have two or more worked edges and 16 have only one worked edge. Side scrapers predominate. One (Fig. 27, L) has pronounced sinuous edges.

Secondary Flake Scrapers (Fig. 27, E-G). Twenty-seven scrapers are made from flakes which lack any traces of the cortex. As a group they are well made—a few even intentionally shaped—and are generally smaller than either the initial or cortex flake scrapers. For these reasons, the term "secondary flake scraper" is suggested. The striking platform has been removed in many cases, but those still intact are prepared. Scraping edges are neatly percussion chipped, or, in a few instances, pressure flaked. These scrapers range from 25 to 55 mm. in maximum diameter or length.

Several subgroups, based largely on variations in the outline form, can be distinguished. Eight are long, rectangular scrapers with chipping along two or more edges (Fig. 27, E). A number of these—because of the fine workmanship and chipping along more than one edge—appear to have been intentionally shaped. Most are made from end flakes. A second subgroup (Fig. 27, G) of five specimens consists of oval-shaped end scrapers. None, however, can be termed snubnosed end scrapers. Two disc-shaped specimens, with chipping around the entire circumference (Fig. 27, J) constitute a third group. A fourth variety is made up of two concave-edged side scrapers—so-called spokeshaves. The final and largest group, admittedly a catchall category, consists of 11 irregular and fragmentary scrapers.

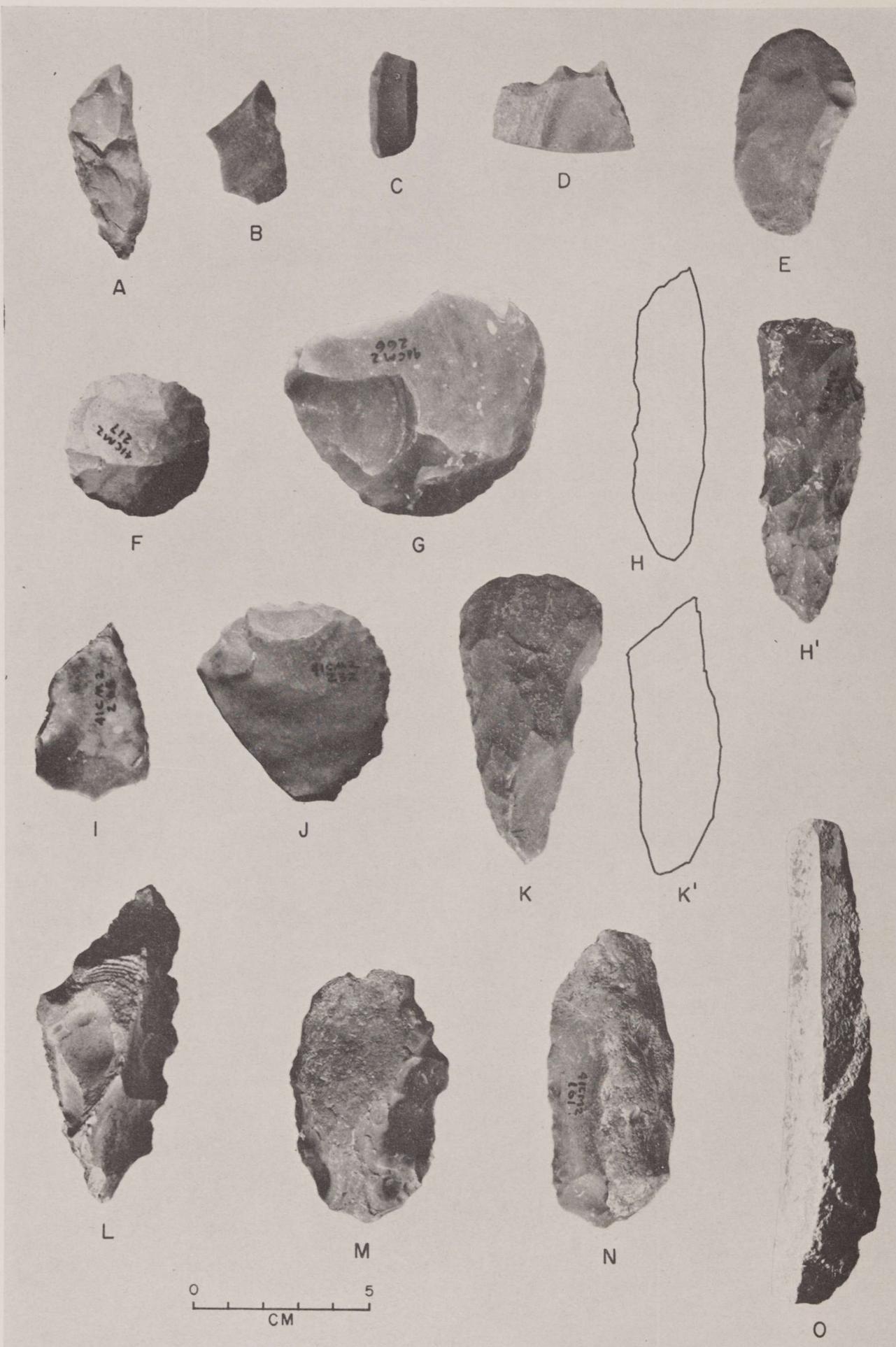


FIGURE 27. Miscellaneous Scraping and Cutting Tools. A, B, Burins. C, Retouched lamellar flake. D, Graver. E-G, Secondary flake scrapers. H, H', K, K', Gouges. I, Small cortex side scrapers. J, Medium-sized cortex scraper. L, Sinuous-edge cortex scraper. M, N, Initial cortex scrapers. O, Utilized flake.

Utilized Flakes (Fig. 27, C, O)

Twenty-eight flakes having fine marginal retouching, yet not steep enough edges to suggest a scraper, are termed utilized flakes. Long recognized by archeologists, they have been variously called retouched flakes, use flakes, and flake knives or scrapers. The utilized flakes and the scrapers, however, do intergrade and the distinction between them is, at times, arbitrary.

Marginal retouching occurs on one or both faces of these flakes, although the former predominates. While it is possible that some of the flaking resulted from use, deliberate chipping seems to be indicated for most specimens—the flake scars seem too regular to have been produced only incidental to use. Two types of flakes were used: secondary (20 specimens) and cortex (eight specimens). In general, the cortex flakes (Fig. 27, O) are larger and have faint, bifacial retouching. By contrast, the secondary flakes (Fig. 27, C) are smaller, lack traces of the nodule cortex, and are usually unifacially retouched.

Burins (Fig. 27, A, B)

Four specimens, each apparently having an intentionally produced angular cutting or engraving edge, are quite similar to the burins recently described by Epstein (1960a: 33–47; 1960b: 93–97). Two were fashioned from secondary flakes, and two from knife or dart point blade fragments. The flake scar lengths (15 to 34 mm.) on the parent pieces suggest that the spalls may have been detached by percussion flaking. The two made from secondary flakes appear to be formed by the intersection of two burin facets, or the *burin bec de flute* type (Epstein, 1960b: 93); the other two are formed by the intersection of a hinge fracture with a burin facet.

Gravers (Fig. 27, D)

Ten specimens with small, beak-like projections are termed gravers. They are distinguished from the burins chiefly on the basis of differences in technique of manufacture. It is possible, however, that both served as engraving tools. All gravers are unifacially worked, and are more or less circular in outline. The average diameter is about 40 mm. Seven have a single projection and three have two projections. The graver points are from 1 to 4 mm. long and are formed by pressure retouching. In addition to the graver protrusion, most specimens have one or more scraping edges.

Core Tools (Fig. 28, A–C)

Choppers (Fig. 28, B, C). Represented by 15 specimens, choppers are the most numerous of the core tools. All are crudely fashioned from streamworn chert cobbles, and

still retain large portions of the weathered cortex. A massive and sinuous cutting or “chopping” edge—produced by the removal of large percussion flakes from both surfaces—occurs on only one end (the distal end). The opposite, proximal, end is unaltered, presumably indicating that these implements were held in the hand rather than hafted.

On the basis of the relationship between the length and width, two descriptive subgroups can be recognized: (1) Six specimens which are broader than they are long (Fig. 28, B). These range in size from 89 x 77 mm. to 91 x 84 mm. (2) Nine specimens which are longer than they are broad (Fig. 28, C). These range in size from 69 x 67 mm. to 123 x 74 mm.

Core Scrapers (Fig. 28, A). Similar to the choppers, seven heavy core tools are crudely chipped from chert cobbles in such a manner as to retain portions of the cortex. They differ from the choppers in that the distal end, although it is sometimes bifacially worked, is plano-convex and has a steep scraping edge. Use as heavy butchering or crude woodworking tools seems indicated. They range from 35 to 75 mm. in height, and from 44 to 67 mm. in width.

Manos (Fig. 28, D, F)

The four manos from Footbridge are unshaped river-worn cobbles. One is of limestone, two of quartzite, and one, less than half complete, of granite. Three are subrectangular in outline and have evidence of use on two opposing faces (Fig. 28, D). They range in length from 95 to 135 mm., in width from 70 to 97 mm., and in maximum thickness from 34 to 45 mm. In cross section they are either biconvex (1), or plano-convex (3). One shows secondary use as a hammerstone, or possibly as a chopper.

A fourth specimen (Fig. 28, F) differs considerably from the above in that it is irregular in outline and has three small, but distinct, grinding facets. Two of the facets occur along the lateral edge of one face, the third along one lateral edge of the opposite face. All three of these worn facets are convex. The localized nature of the worn surfaces suggests that this specimen may have been employed in specialized tasks, perhaps to smooth hides. This specimen measures 98 mm. in length, 68 mm. in width, and 44 mm. in maximum thickness.

Historic Materials

A small group of miscellaneous, quite recent European artifacts was found in the uppermost portions of Unit I and on the surface of Area B—those portions of the site adjacent to the stone structure (see p. 56) attributable to Europeans. These materials include bottle fragments, a

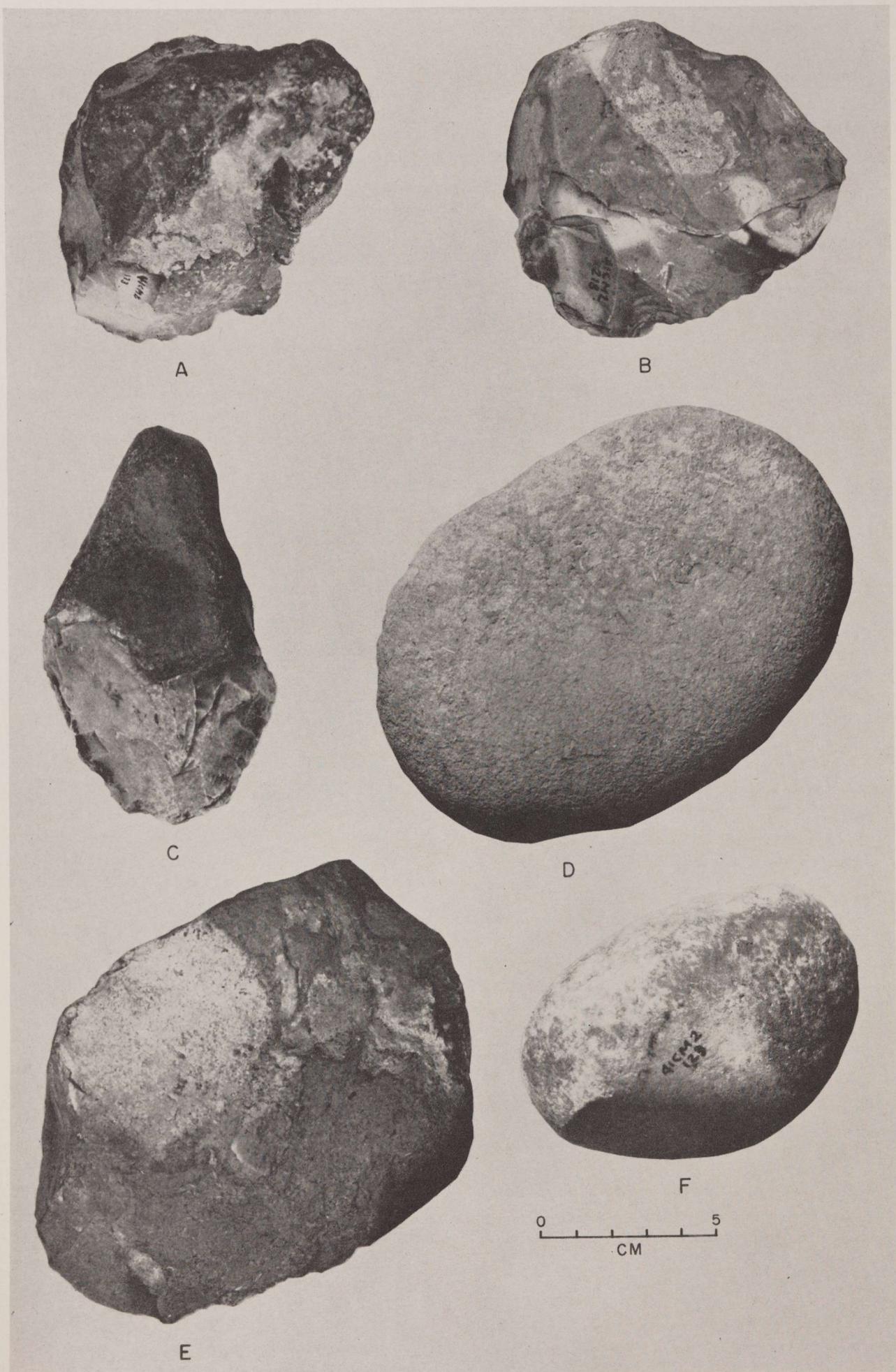


FIGURE 28. Scrapers, Choppers, and Manos. A, Core scraper. B, C, Choppers. D, Biconvex mano. E, Large initial cortex scraper. F, Multi-faceted mano.

mother-of-pearl button fragment, nails, a bolt, a 22-cartridge, and a piece of polychrome earthenware.

Worked Shell

An intentionally cut fresh water mussel shell (Fig. 25, A) constitutes the only worked faunal material found at the Footbridge Site. That it was deliberately severed is

clearly indicated by the absence of shattering scars along the cut edges. Only a small portion—specifically, the area about the hinge and anterior muscle scar—of the original shell remains. Two cuts, a straight one along the lower or ventral edge and an inwardly curved one along the posterior side, have formed a roughly rectangular piece which measures 35 by 31 mm. Since none of the edges shows signs of use, it is possible that this piece is simply the residue from the manufacture of an artifact.

CHIPPING TECHNOLOGY

Since the overwhelming majority of the artifacts from the site are of chipped stone, it seems appropriate that the techniques of flint knapping be examined. The value of this approach is ably demonstrated in two recent papers (Epstein, 1960a; Johnson, 1961) dealing with several sites in the Amistad reservoir area. The classification and analysis presented here draw heavily upon these two reports, and upon unpublished research by Kenneth H. Honea (ms.).

Materials utilized in this analysis include over 6,000 flint flakes, 89 cores, and 365 chipped stone artifacts. Although they should be regarded as preliminary—largely because our knowledge of flint chippings is still in its pioneer phases—several interesting observations can be noted:

(1) Most importantly, the nature of the flint debris suggests that the majority of the "roughing out" of the chipped stone artifacts occurred away from the site. Cores are not common and most of the flakes found appear to be the result of trimming or final shaping of the tools.

(2) River-worn chert nodules, very likely obtained from the Guadalupe River bed, were the major (perhaps exclusive) source of raw material. The desired tool was roughly fashioned by percussion chipping, apparently almost always by means of a hammerstone. In many cases, the first step, after the selection of the nodule, was the preparation of a suitable *striking platform*—an intentionally produced flat surface designed to receive the blow of the hammerstone. However, those nodules naturally having a fairly flat surface (produced by stream wear) usually lack prepared striking platforms. The latter are present in the Footbridge collection, but are less frequent than cores and flakes with prepared striking platforms.

(3) Flakes suitable for the production of artifacts were derived from the cores themselves or from a large flake removed from the core. The first is herein termed a *pebble core*, the second a *flake core*. These two are just about equally represented in the collection, but in very small numbers.

(4) The most common type of pebble and flake core (65 examples) had flakes removed from various angles, the so-called *multi-platform core* (Honea, ms.). Seven cores can be described as *single-ended*; that is, flakes had been detached from one end. One core is *double-ended*; i.e., had flakes removed from both ends. Two polyhedral cores with prepared striking platforms, as well as 42 flakes which are derived from these or similar cores, represent the *lamellar* technique. It was, however, only a minor technology at Footbridge.

(5) There are indications that the flint knappers preferred to strike the core in such a way as to produce flakes which, relative to the bulb of percussion or striking platform, were longer than they were broad. A similar trend was observed in certain artifacts, particularly the scrapers, which were more frequently fashioned from the long or *end flakes* than from the *side flakes* (i.e., relative to the bulb of percussion side flakes are broader than they are long, while end flakes are longer than they are wide).

(6) The majority of the classifiable flakes have features which suggest that they may have been detached by means of a *billet*. (A billet may be defined as a cylindrical percussor of material softer than the chert, such as wood, bone, or limestone). The distinctive features of a billet flake are: (1) absence of a bulb of percussion, (2) oblique striking platform, (3) lipping of the edge of the striking platform, and (4) tendency to be thinner than flakes thought to have been detached by a hammerstone.

(7) Finally, no temporal changes in flint chipping techniques were observed.

ANIMAL REMAINS

Animal bones were not well preserved, nor were they very numerous. In fact, the bulk are small, unclassifiable fragments. The few forms that could be identified (Gerald Raun, personal communication) include deer, bison, and turtle, in that order of frequency.

In contrast to the animal bones, snail and mussel shells were abundant, and large samples of both were collected for identification and for carbon-14 dating. Unfortunately, however, these have not yet been analyzed.

Table 2.
Provenience of the Artifacts, Footbridge Site.

SUMMARY

Archeological investigations at the Footbridge Site unearthed the remains of several distinct occupation zones buried in alluvial silts of the Guadalupe River. Despite a rather low artifact yield (396 specimens) and a poor understanding of the depositional process, the gross succession of cultural remains is readily demonstrable. The earliest and best represented of these is identifiable as the Archaic Edwards Plateau Aspect. It is overlain by a very light Neo-American component, the Central Texas Aspect. The final and most recent occupation is attributable to Europeans. Without exception, the European remains are quite modern and postdate the latest aboriginal material by at least three centuries.

Only five artifacts, all arrow points, can definitely be associated with the Central Texas Aspect. These specimens were concentrated in the upper levels of the northern part of the site (in Unit I). The types of arrow points identified, *Scallorn*, *Granbury*, and *Perdiz*, suggest that both the Austin and Toyah foci may be represented (Suhm, 1960; Jelks, 1962). Although the sample is quite small, it is interesting to note that the *Perdiz* point (Toyah Focus) overlay the *Scallorn* and *Granbury* points (Austin Focus). Thus it is possible that the most recent aboriginal remains found at Footbridge, the Central Texas Aspect, may represent at least two very light occupations.

By contrast, the Edwards Plateau Aspect is fairly well represented, and evidence for repeated, but intermittent, use of the site is much firmer than for the Central Texas Aspect. More specifically, Edwards Plateau Aspect artifacts were found throughout Unit I, but generally below the arrow points, and in units II and III, in zones A, C, and D. Zone B, which separated zones A and C, was essentially sterile; the limited amount of cultural debris found in this stratum appears to be the result of mixture with other zones.

Since the zones recognized in the southern part of the site could not be physically traced to the northern end of the excavations, the relationships between the material in Unit I and in units II and III are not readily apparent. There are, however, two possibilities: (1) that Unit I is the equivalent of Zone A, or (2) that Unit I is more closely linked to Zone C. The first hypothesis assumes that the site was buried in a single, much eroded terrace; the second requires two terraces. Unfortunately, the geological findings are inconclusive and one interpretation is just as tenable as the other. This, then, means that the correlation and relationships of the occupational zones must be discerned solely on the basis of the archeological findings—specifically upon the occurrences of the dart point types.

The identifiable dart points number 51 specimens, but

so many varied forms are present that no one group is well represented. Consequently, the significance of the distributions is greatly diminished. With this rather stringent limitation in mind, the occurrences of the point types can be summarized as follows (see also Table 2):

(1) Within Unit I, the upper levels (0–18 inches) contained a few arrow points together with dart point types *Nolan* (1) and *Bulverde* (1). Below 24 inches only dart points were found, with small expanding-stem forms (*Ellis*, *Ensor*, *Fairland*, and *Unclassified* I) being the most characteristic. Probably to be linked culturally with this group (Suhm, 1957; 1959) are the two *Darl* points also from Unit I. The other dart point types in the lower part of Unit I are larger and include *Nolan* (3) and *Lange* (1).

(2) In units II and III, Zone A is overwhelmingly dominated by large, rectangular-stemmed points, with types *Bulverde*, *Travis*, and *Pedernales* being most common. In addition, one *Meserve* point and a ground-edge basal fragment of a second point (both probably intrusive) were found near the surface of Zone A, Unit III.

(3) Zone B contained two points, *Pedernales* and *Frio*, which are probably derived from Zone A or C.

(4) Zone C yielded a potpourri of forms, although *Darl* and *Uvalde* are the best represented. Other types include two *Pedernales*, three *Lange*, one *Tortugas*, and a questionable *Shumla*.

(5) The point sample from Zone D is poor—only three specimens—with types *Edgewood*, *Marshall*, and *Martindale* having been found.

This distribution of points suggests that the situation is culturally and geologically complex, and any attempt at correlation forces one onto a flimsy limb. The *Darl*, *Ensor*, *Fairland*, *Ellis*, and *Edgewood* group gives fair grounds for relating most (all but the Central Texas Aspect material) of Unit I with Zones C and D and, thus, assuming the presence of two terraces. On the other hand, *Nolan*, *Lange*, and *Bulverde* provide a link—though considerably weaker—with Zone A and, hence, argue for a single terrace.

However, either correlation poses serious difficulties and conflicts with the dart point sequence which has emerged from several recently excavated Edwards Plateau Aspect sites. In brief, there are data (see Synthesis for a fuller discussion) to indicate that *Nolan* points appeared earlier than *Pedernales* (Kelly, 1961; Johnson, herein); that *Pedernales* was followed by *Montell*, *Frio*, and *Ensor* (Tunnell and Johnson, herein); and that these were in turn superseded by *Darl* (Suhm, 1957; 1959). At Footbridge, regardless of how the zones are aligned, this sequence is almost entirely reversed. Therefore, if the above succession of dart point types is correct, then Zone A can be explained only as a secondary deposit. In view

of the eroded and disturbed nature of the site this is quite possible, although a specific source for Zone A cannot be indicated.

In sum, the internal succession of Edwards Plateau Aspect occupations is anything but clear at Footbridge, and all possible interpretations are, at best, strained. They do not—at least without stretched rearranging—support

the findings made at the nearby Wunderlich and Oblate sites. On the other hand, the data from Footbridge are too weak to disprove them, much less to offer an alternative reconstruction. Perhaps the most significant conclusion to be made is that the site calls attention to some of the complexities of alluvial deposition and to the possible disturbances that can result from natural erosion and human activities.



OBLATE: A ROCKSHELTER SITE

CURTIS D. TUNNELL

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INTRODUCTION

In August, 1949, an archeological survey of the area to be affected by Canyon Reservoir was carried out by Robert L. Stephenson, Smithsonian Institution archeologist, as part of the Inter-Agency Archeological Salvage Program. The Oblate Site, described as "a small, shallow, but long shelter [with] undisturbed fill, talus [alluvial terrace] in front, [and] some midden refuse" (Stephenson, 1951: 3), was one of the eight sites recommended for excavation.

The original number assigned to the Oblate Site, 41-63B2-9, was subsequently changed to 41CM1 in conformity with the revised site numbering system recently adopted by The University of Texas. The site has been given the additional name "Oblate Rockshelter" after the Missionary Oblates of Mary Immaculate, the organization which made the shelter available for excavation.

Test excavations were carried out at the site in the fall of 1959 by the Texas Archeological Salvage Project. Important stratigraphic information resulted from this first season's work, but since the testing had not been extensive enough for full interpretation of the site, additional excavation was undertaken in the fall of 1960.

The Oblate Rockshelter, situated on a small tributary south of the Guadalupe River, consisted of a stratified

midden deposit resting beneath an overhanging ledge of limestone and extending out into a broad alluvial terrace in front of the shelter. During the two field seasons, 35 five-foot squares were excavated to various depths and 1,609 artifacts—described herein in detail—were recovered. A study of the provenience of the artifacts has produced important data concerning the relative chronology of certain artifact types.

The midden deposits at the Oblate Site, in the area excavated, ranged in depth from three to eight feet. The uppermost half-foot level produced various historic artifacts made of metal and glass, including a glass bead, gunflints, and brass gun parts which possibly date from the 18th century contact period (Kelley, 1947c: 46). Other historic artifacts—tin cans, bottles, bottle caps and the like—are of 20th century provenience. From the surface to a depth of one to two feet the soil contained artifacts assignable to the Austin and Toyah foci of the Central Texas Aspect, Neo-American Stage (Suhm *et al.*, 1954: 112-117; Jelks, 1962). The lower levels of the midden deposits produced cultural materials characteristic of the Edwards Plateau Aspect of the Archaic Stage (Suhm *et al.*, 1954: 102-112). Within the latter aspect, at least two distinct periods seem to be represented.

ACKNOWLEDGMENTS

This report was made possible by the generosity and untiring efforts of many individuals. First, it is my pleasure to acknowledge the contribution made by the Missionary Oblates of Mary Immaculate on whose property the site was located. They not only allowed excavation of the site, but also made available comfortable living quarters at the San Enrique Ranch. Pat McCarty, foreman for the ranch lessee, is due a special note of thanks for his cooperation in granting access to the area and for many hours of assistance in overcoming various problems connected with the project.

First among those donating labor to the actual site excavation were Colonel and Mrs. T. C. Kelly. Two full weeks of "vacation" were unselfishly spent by the Kellys in the September sun working on the dig. Others who do-

nated excavation assistance are: Mr. and Mrs. W. L. Richmond, Johnny Greer, Mrs. J. M. Lathan, Jewel C. Pollard, Jr., Jerry J. Stipp, and Olin L. Crook.

In addition to the writer, the regular field crews consisted of: 1959—Herbert L. Alexander, Jules R. Gipson, J. Milburn Lathan, Chester R. Rogers, Richard E. Ross, and John M. Ruegenberg; 1960—John Avant, Jacob Bergolofsky, Tom Cook, David L. Dean, Kenneth Honea, Robert C. Hoover, Horace Johnson, Philip Kendall, Alford Marx, Parker Nunley, and Jimmy Swayze. Cataloging of the specimens and other laboratory work were accomplished in part by Floydene Gibson and Kenneth Bennett.

The author is especially indebted to Edward B. Jelks, L. F. Duffield, LeRoy Johnson, Jr., E. Mott Davis, Mrs. Mardith Schuetz, and Kenneth Honea, for their assist-

ance on technical problems concerning the excavation of the site and the preparation of this report. J. F. Epstein examined large quantities of flint flakes from the Oblate Site and furnished the identification and description of

the burins (p. 108). Soil samples for pollen analysis were collected from all zones of the floor deposit by Donald Larson. Detailed maps of the Canyon Reservoir area were provided by the United States Corps of Engineers.

SITE DESCRIPTION

Location

The Oblate Site, 41CM1, is located about 16 airline miles north-northwest of New Braunfels in Comal County, along the east bank of a small spring-fed creek which flows into the Guadalupe River (Fig. 29). The site lies 400 feet south of the main river channel and has, according to local informants, been subject to occasional inundation during severe floods.

The Rockshelter

The Oblate Rockshelter was formed by an overhanging ledge of Cretaceous limestone containing great quantities of marine invertebrate fossils. The limestone formation flanking the creek was sculptured into many horizontal ledges and overhangs by the meanderings of the stream during an initial cutting phase. Subsequent weathering and erosion have caused most of these potential shelters to collapse, but the ledge forming the Oblate Shelter seems to have remained essentially intact for several thousand years. Flooding of the nearby Guadalupe River, combined with weathering of the limestone cliff, has gradually built up a sandy deposit against the shelter wall.

The overhanging ledge extended for some 150 feet along the eastern edge of the creek valley just south of a dry arroyo (Fig. 29). The shelter formed by the overhanging ledge was from two to 12 feet deep. A rockfall, located approximately in the center of the overhang, divided the shelter into two sections (Fig. 29). The north section, designated Area A, was tested extensively and produced an abundance of cultural material; the south section, Area B, contained shallow deposits, but a test in the center of the area produced only sparse cultural remains. Several massive recent rockfalls in Area B seemed to have caused an increase in water erosion which may have removed floor deposits from that section of the shelter.

In cross section the shelter was shallow, having an essentially flat ceiling, a shelf in the rear wall, and several ledges which formed the rock floor beneath the deposits (Fig. 30). These flat, almost horizontal, limestone shelves extended along the entire length of the overhang follow-

ing bedding planes in the limestone formation. The uppermost ledge beneath the floor deposit averaged about eight feet in width, was about two feet below the deposit surface, and like the ceiling, was essentially flat. A vertical drop of from one to one and a half feet separated this ledge, number 1, from the next lower ledge, number 2. The second ledge, also about eight feet in width, dipped outward at a rather steep angle. A drop-off of about two feet separated the second and third floor ledges. Floor ledge number 3, the lowest encountered, was essentially horizontal, rather smooth, and lay some seven to eight feet beneath the surface of the deposit. The outer edge of this ledge was encountered only in the western half of 5-foot square N220-W112.

At the north end of Area A the overhang averaged about five feet above the surface of the floor deposits; this distance increased toward the south until a maximum of about eight feet of headroom was attained. There were eight to nine feet of space separating the upper floor ledge and the overhang throughout the area excavated in Area A.

Evidence that this shelter retained its attraction as a habitation spot until recently was found in the form of modern campfire remains, wine bottles, and tin cans on the surface. Some smoke stains on the ceiling probably resulted from these recent fires. Similar rockshelters farther west along the Balcones Escarpment sometimes show evidence of aboriginal pictographs and carbon staining on the walls and overhang, but if any such evidence ever decorated the Oblate Rockshelter it was obliterated by weathering. Some of the ceiling spalls found deep in the excavation showed traces of carbon on one face, and were probably stained by fires which warmed the shelter in past ages.

Surface of the Midden Deposits

The floor deposits consisted primarily of sandy alluvia, derived from periodic flooding of the Guadalupe River and its tributaries, and detritus from the limestone ledge. Beneath the overhang the deposit surface was devoid of vegetation, was relatively loose and dry in texture, and dipped gently from north to south (Fig. 30). The depth of the fill ranged from two and a half feet near the rear

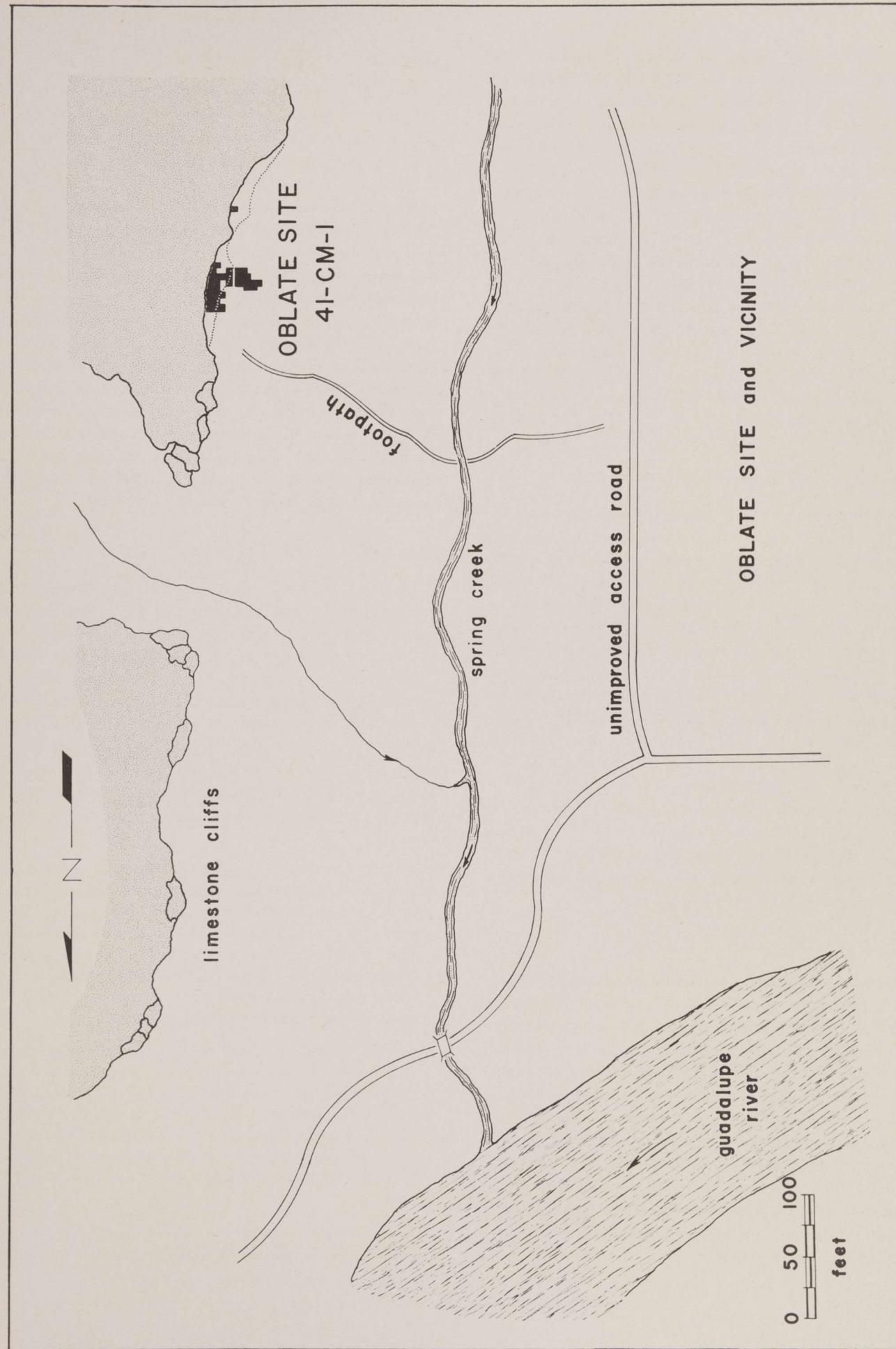


FIGURE 29.

wall to about eight feet at the edge of the overhang. The only disturbances noted were rodent burrows and a small test pit dug by the 1949 archeological survey party. Several large limestone boulders lay on the surface in the north section of the shelter (Fig. 31). After their locations were recorded, these stones were broken up and rolled away from the excavation area; other boulders encountered during the excavation were removed in a similar manner.

In front of the shelter a broad alluvial terrace sloped for approximately 160 feet down to the creek channel. This damp, sandy soil was covered with a thick growth of native grasses and small trees. Shallow test excavations there produced a considerable amount of cultural material including most of the potsherds recovered. One deep test at N225-W130 (Fig. 30) encountered mussel shells, burned rocks, and scattered cultural debris down to a depth of nine feet below the surface.

Geologic Stratigraphy

On the uppermost floor ledge, beneath the overhang, the deposits were relatively dry and the soil zones were easily detected in all of the vertical profiles. These dry deposits generally contained large quantities of ash which gave an overall grayish cast to the soil zones. On the other hand, the midden deposits forming the unprotected slope were damp and compact in nature and generally tan or brown in color. It is assumed that the ash had been leached out of the zones in this part of the site, or had become diffused throughout the fill by percolating ground water. However, it is also possible that most of the aboriginal fires were constructed beneath the overhang, thus leaving the frontal slope relatively free of ash.

Three major soil zones were recognized in the shelter deposits. The lowest was designated Zone I, the middle Zone II, and the highest Zone III. In the drier floor deposits beneath the overhang Zone III was further divided into a lower unit, IIIa, and an upper one, IIIb.

Zone I

This zone was composed of a sandy alluvium ranging in color from light to medium brown. It was very compact in texture and contained numerous limestone spalls from 6 to 15 cm. in diameter. Almost no ash could be detected in this soil. Zone I ranged from a few inches in thickness on the uppermost floor ledge to about three feet thick on the lower ledge at the edge of the overhang (Fig. 30). At several locations on the uppermost floor ledge, Zone I could not be recognized, and it is assumed, therefore, that this ledge may have been partially exposed during the deposition of Zone I. Mussel shells were abundant in Zone I but flint flakes and artifacts were somewhat less numerous than in the overlying zones.

Zone II

Zone II, composed of a rather compact, fine, sandy soil, was the major artifact-producing zone at the Oblate Site. Its color varied from medium gray beneath the overhang, to gray-brown beyond the overhang. Zone II contained large numbers of mussel shells, some snail shells, and small limestone spalls many of which showed evidence of having been burned. The gray color of this zone was due primarily to its heavy ash content. Many small ash lenses were discovered at various levels in Zone II but no trace of stone-lined hearths or fire pits was detected. This zone averaged one to one and one-half feet thick on the upper floor ledge and gradually increased in thickness beyond the overhang, attaining a maximum of three feet on the W110 line (Fig. 30). Stone artifacts and flint flakes were abundant in Zone II. The separation of Zones I and II was based on slight differences in color, texture, and content. The line of demarcation was discernible in all recorded profiles, but it became less distinct in the more compact, damp deposit outside the overhang.

Zone III

The uppermost soil layer, Zone III, was more variable in composition than either of the other two zones. It ranged from one foot in depth at the rear wall of the shelter to a maximum depth of two feet on the slope in front of the overhang. Beyond the overhang, Zone III consisted of granular, humus-stained soil. It was loose in texture and ranged from light brown to medium brown in color. Several concentrations of thin, unburned limestone flakes were found and the usual cultural material and mussel shells were present. In the protected area beneath the overhang two subzones were discernible within Zone III.

Zone IIIa. The lower subzone, IIIa, consisted of a rather compact tan sand (containing very little ash) which may have been water deposited. Cultural debris consisted of a small number of stone spalls and mussel shells. Zone IIIa averaged about six to nine inches in thickness in all vertical profiles where it could be recognized. This subzone was easily defined in the profiles beneath the overhang, contrasting with the strata above and below in both texture and color.

Zone IIIb. Zone IIIb, a loose soil with a granular appearance, ranged from medium brown to gray-brown in color. Several extensive but thin lenses of white ash were encountered just beneath the surface of the deposits in this zone. Cultural detritus occurred commonly in Zone IIIb but limestone ceiling spalls were relatively rare. This subzone averaged about six inches in thickness throughout the drier part of the deposit.

In the deep test pit on the terrace slope (Fig. 30) the zones described could not be distinguished. The deposits

OBLATE SITE, 4I-CM-1
CROSS SECTION along the N225 line

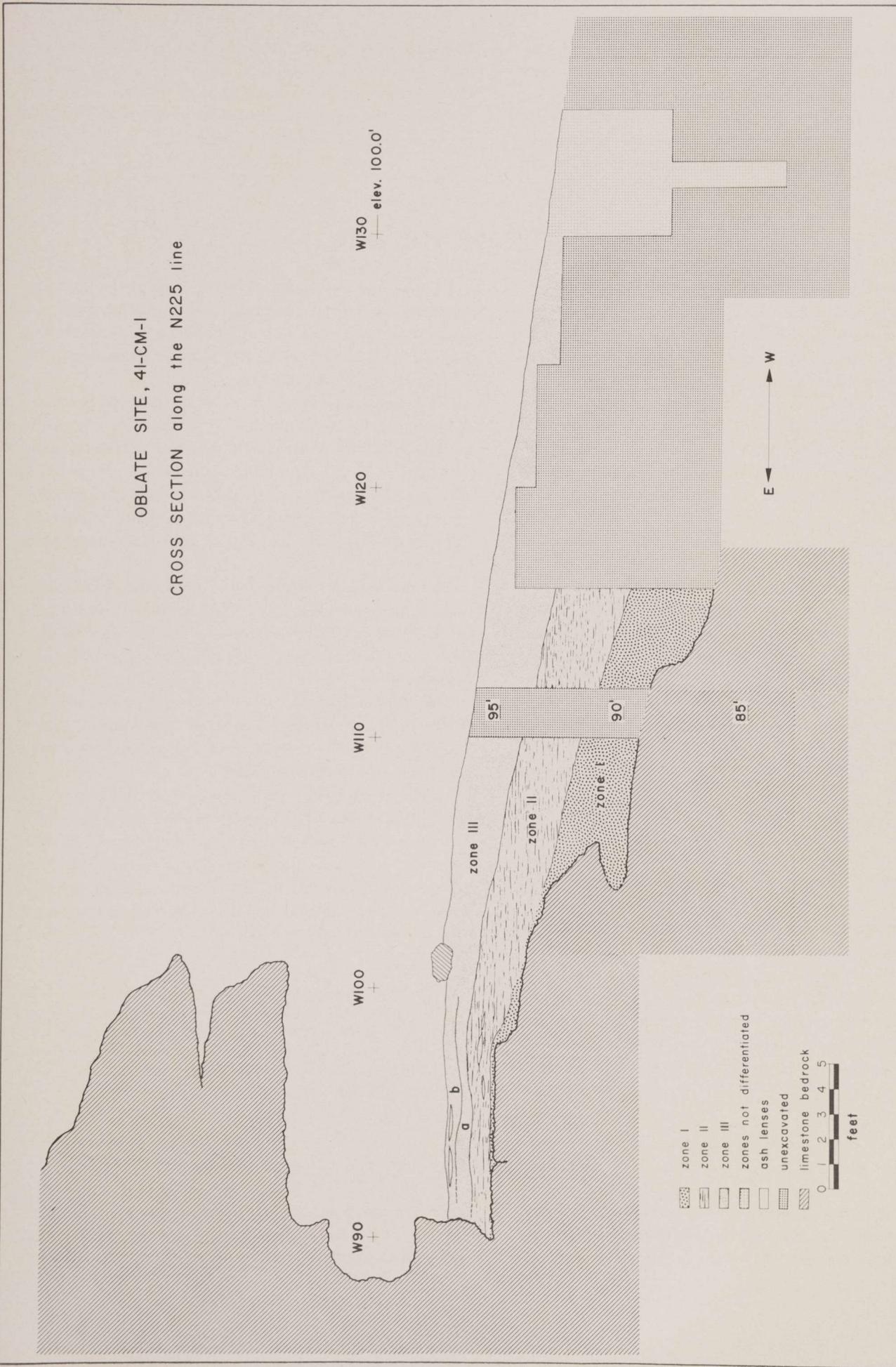


FIGURE 30.

in this area consisted of a homogeneous, fine-grained, tan, sandy alluvium. Brown humus staining extended from the surface downward for about six inches. A number of plain potsherds was found in the upper one foot of the deposits in this area; flint flakes and mussel shells were encountered throughout the remainder of the deposits down to the

floor of the excavation at about nine feet below the surface. There was, however, a paucity of artifacts in the slope deposits, and limestone rocks of any size were rare. Neither sterile subsoil nor limestone bedrock was reached in this deep test of the terrace slope.

EXCAVATION OF THE SITE

To initiate work at the site a primary datum point—to serve as a vertical reference mark during the mapping and excavation—was established on a centrally located limestone boulder. The horizontal position of this datum point was recorded on the grid system used at the site (Fig. 31). The primary datum mark was assigned an arbitrary elevation of 100 feet and all other elevations at the site were recorded relative thereto.

A contour map of the surface of the midden deposit (Fig. 31) was constructed, using a telescopic alidade.

A grid of 5-foot squares oriented with magnetic north was superimposed on the surface of the site with the aid of appropriate surveying instruments. A system of coordinates (expressed as distances in feet from the datum) was used to designate each of the grid stakes, and each excavation unit, or 5-foot square, was called by the designation of the grid stake at its southeast corner.

Most of the site was excavated by half-foot levels measured in relation to the primary datum elevation. The only exceptions to this procedure were squares N225-W90 and N230-W90 which were partially excavated in 3-inch vertical intervals in an attempt to separate more accurately the cultural material in Zone IIIa and IIIb.

As a preliminary test, four 5-foot squares were excavated down to bedrock along the N220 line, and four others along the N245 line. It was originally planned to excavate the remaining 20-foot wide central block by following the natural strata, using the vertical profiles in the two trenches as guides. This technique was attempted in several squares, but even though the natural stratigraphy was readily apparent in the profiles, the strata limits could not be detected when encountered in the horizontal floors of the test squares. Therefore, since the dip of the strata was slight, all subsequent squares were excavated by arbitrary levels rather than by natural zones. All vertical profile walls were recorded showing the geologic zones.

Each test square was excavated down to the limestone bedrock; the bedrock was swept clean and examined for any alteration by the human inhabitants of the shelter, and as a result, two bedrock grinding surfaces (p. 109) were discovered and recorded.

All of the excavated deposit was passed through screens of quarter-inch mesh and all cultural material was sent to the laboratory for analysis. Only the soil, limestone spalls, and some of the snail and mussel shells were discarded in the field.* Special care was taken in collecting organic remains for radiocarbon dating, soil samples for zone description and analysis, and soil samples for palynological analysis.

The first season's excavation at the Oblate Rockshelter was begun September 1 and was terminated on September 25, 1959. With an expenditure of 885 man hours, a 600-square foot area was excavated and some 1800 cubic feet of deposits were removed and screened.

The 1960 field season, from 28 August to 9 September, 1960, consumed an additional 640 man hours of labor, and resulted in the excavation of 275 square feet of area and 1,238 cubic feet of deposits.

Standard recording forms, prepared by the Department of Anthropology, were used to record the bulk of the field notes, which were prepared in duplicate. All field notes and maps are filed at the Department of Anthropology, The University of Texas. Several hundred color, and black and white photographs were taken during the excavation of the site.

* The large quantity of flint and other debris derived from the excavation has been of use for laboratory analysis. A percentage study of chipping techniques based on the residual flakes has been carried out (Alexander, ms.), and other valuable information has been preserved which might have been lost through less thorough collecting techniques.

THE ARTIFACTS

The Oblate Site yielded 1,609 recognizable artifacts, all of which are now stored at the Department of Anthropology, The University of Texas. Included are artifacts

made of stone, bone, metal, fired clay, and other materials.

With only a few exceptions the stone artifacts, which comprise the bulk of the specimens recovered, are made

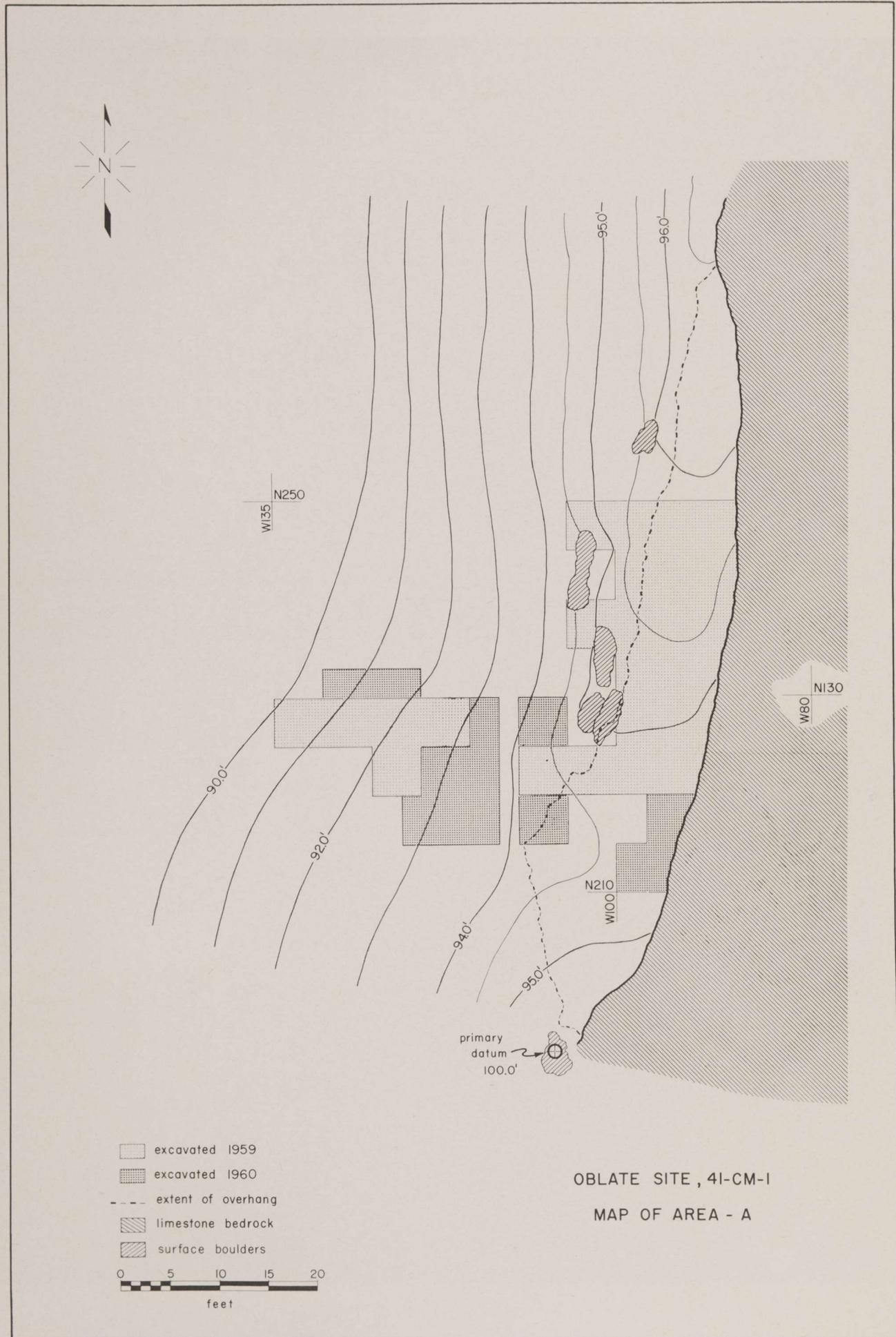


FIGURE 31.

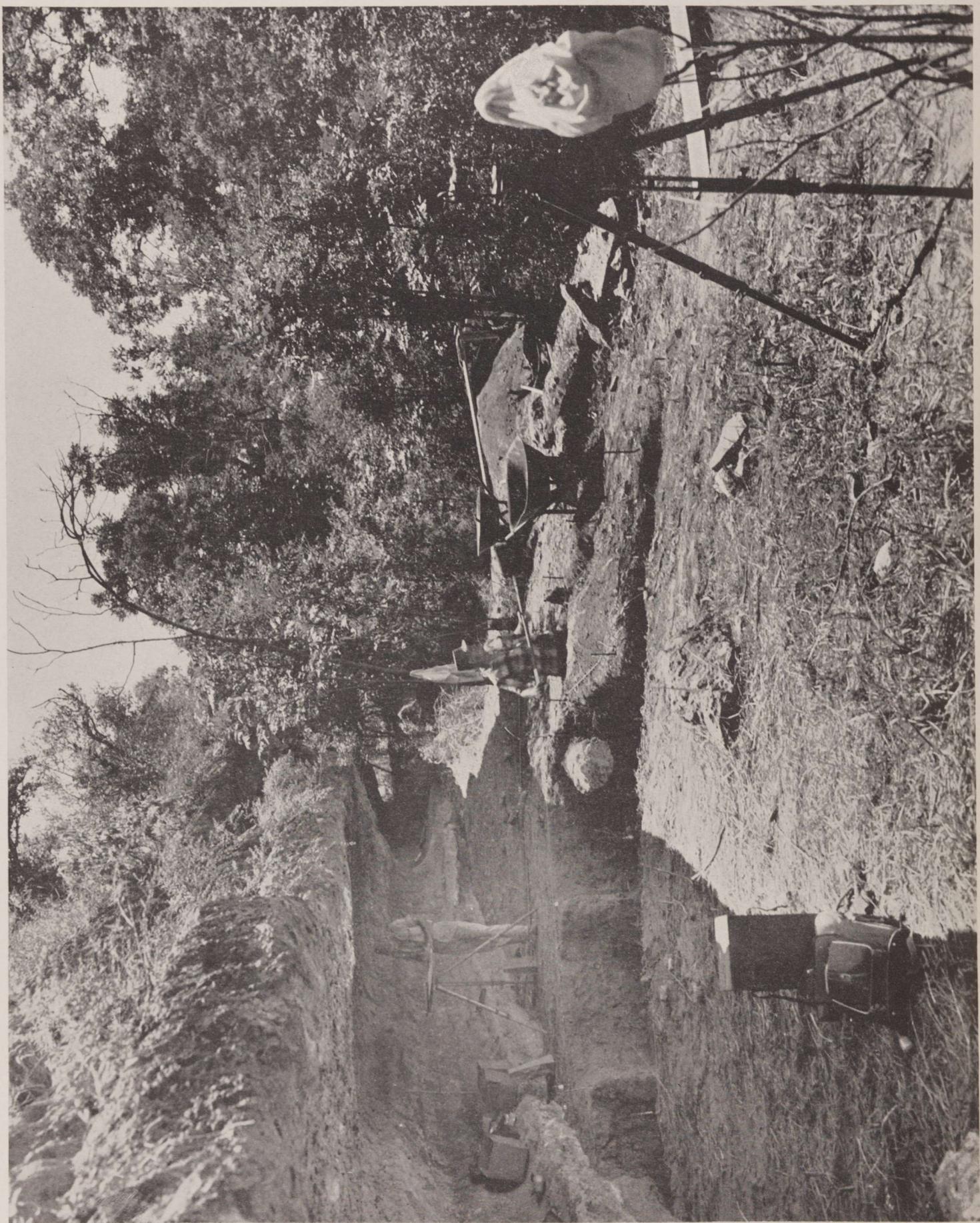


FIGURE 32. General view of the Oblate Site during excavation, looking south.

from cherts, flint, and other varieties of cryptocrystalline silica. This stone commonly occurs in the local limestone deposits both in nodular and tabular forms, and is found as water-worn cobbles in all the streambeds of the area. It varies from a dark-colored translucent stone, commonly called flint, to a coarser opaque variety of stone, light in color, classed here as chert. Other rocks and minerals occurring at the site are: calcite, obsidian, crystalline quartz, quartzite, hematite, and sandstone.

Projectile Points

All thin, triangular or lanceolate-shaped, stemmed or unstemmed, chipped stone tools which *could have been hafted* onto projectile shafts are included within the projectile point category. A total of 394 such specimens was recovered from the excavation of the Oblate Shelter. Two groupings of these artifacts are readily apparent: (1) broad, thick, heavy points assumed to have been used as tips for either atlatl darts or hand spears and (2) relatively light, thin, slender points supposedly used as arrow points.

Dart Points

Thirteen types of dart points are recognized in the collection from the Oblate Site. The dart points average 50 mm. in length, 27 mm. in width, 7 mm. in thickness, 7.37 grams in weight, and 17.40 mm. in width at the junction of the stem and the blade. Dart points occurred throughout the deposit at the site, but tended to cluster in Zones I and II (Fig. 30).

ALMAGRE (Fig. 35, A)

Number of specimens: 1

Form: The blade is triangular with one concave and one convex edge. The tip is broken. The shoulders are sharply defined and slope into a stubby contracting stem with a slightly concave base. This point is shaped primarily by percussion, but the blade edges show fine secondary pressure flaking.

Dimensions: Estimated length: 30 mm.; width at shoulders: 54 mm.; thickness: 17 mm.

Weight: An estimated 15 gm.

Material: Light tan chert.

Distribution: Zone I.

ANGOSTURA (Fig. 35, I)

Number of specimens: 1

Form: The blade edges of this fragmentary point diverge above the concave base, indicating a lanceolate outline for the original complete specimen. The workmanship is excellent. Both faces are covered with large, parallel flake scars, and fine secondary pressure flakes have been removed from the blade edges and from the base on both faces. Both blade

edges are ground smooth from the base to the terminal fracture.

Dimensions: Length of the fragment: 33 mm.; maximum width: 23 mm.; width at the base: 15 mm.; depth of basal concavity: 2 mm.; thickness: 5 mm.

Weight: Point too fragmentary to be determined.

Material: Fine-grained, translucent, gray-brown flint. No other stone fragments of this fine quality were found at the Oblate Site.

Distribution: Apparently from Zone II. A wheelbarrow of Zone II dirt was accidentally spilled on the surface, and the point was found on top of the pile immediately after the upset occurred.

Remarks: This basal section of an *Angostura* is the only artifact recovered at the Oblate Site which is assignable to the Paleo-Indian Stage; it is considered to be intrusive into Zone II.

BULVERDE (Fig. 36, E)

No. of specimens: 4

Form: The blades range from triangular to long and leaf-shaped; the blade edges vary from straight to convex. Three specimens have prominent, square shoulders and the fourth has small barbs. The stems are rectangular with straight, parallel edges. Bases are straight, slightly concave, or slightly convex.

Dimensions: All four points are fragmentary, making it impossible to determine certain of their dimensions. Stem

Table 3.
Distribution of Dart Points by Zone.

Type	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Pro- venience uncertain		Totals
						Zone	Zone	
Almagre	1	--	--	--	--	--	--	1
Angostura	--	--	1	--	--	--	--	1
Bulverde	2	1	1	--	--	--	--	4
Castroville	1	1	--	--	1	--	--	3
Ensor A	3	8	7	4	1	1	1	24
Ensor B	--	4	6	4	1	3	18	
Ensor C	--	--	4	2	--	3	9	
Ensor D	--	1	5	--	2	3	11	
Ensor E	--	1	2	2	1	--	6	
Ensor F	--	1	2	2	--	1	6	
Fairland	--	3	2	1	1	1	8	
Frio	1	11	10	5	1	2	30	
Marcos	15	9	--	--	--	--	--	24
Marshall	2	1	1	--	--	--	--	4
Montell	3	2	5	--	--	1	11	
Paisano	--	--	--	--	1	--	1	
Pedernales A	2	--	--	--	--	1	3	
Pedernales B	2	--	--	--	--	--	2	
Pedernales C	3	--	1	--	--	1	5	
Tortugas	--	--	--	1	--	1	2	
Misc. & Fragmentary	7	20	17	20	16	16	96	
TOTALS		42	63	64	41	25	34	268

width: 17 to 20 mm.; average stem length: about 15 mm.; thickness: 7 to 10 mm.

Weight: Cannot be determined.

Material: Brownish flint (2), gray chert (2).

Distribution: Zone I (2), Zones I and II mixed (1), Zone II (1).

Remarks: The *Bulverde* points have blades of varying size, but the stems of all the specimens are very similar in both shape and size. None of the *Bulverde* points from Oblate, largely because of their fragmentary condition, can be closely identified with the varieties of *Bulverde* recognized by Johnson (herein, pp. 19-21).

CASTROVILLE

Number of specimens: 2

Form: The blades are broad and triangular with straight and finely flaked edges. The tips are missing. Each point has long thin barbs, a short square stem with straight, parallel edges, and a straight base.

Dimensions: Width at the barbs: 33 and 40 mm.; stem width: 25 and 26 mm.; stem length: 11 and 12 mm.; thickness: 5 and 7 mm.

Weight: Too fragmentary to determine.

Material: Light tan and gray chert.

Distribution: Zone I (1), mixed Zones I and II (1).

Remarks: Although both specimens identified as *Castroville* are fragmentary, they seem to conform to the type description (Suhm *et al.*, 1954: 408, Pl. 83) in every respect.

ENSOR (Fig. 33)

This group of 74 dart points forms a more or less homogeneous side-notched type. Twenty-four of them conform to the standard description of the *Ensor* type (Suhm *et al.*, 1954: 422, Pl. 90): they are relatively long and narrow with deep side notches and straight bases. From these specimens there is an even gradation into five other morphologically similar varieties of *Ensor*-like points. Two of the six varieties recognized at Oblate occurred at the Wunderlich Site (Johnson's *Ensor*, varieties 1 and 2), while only one of the varieties occurred at the Footbridge Site. The vertical provenience of each of the varieties at the Oblate Site is almost identical, indicating—at least at this site—that all of the varieties were approximately contemporaneous.

Ensor, Variety A (Fig. 33, A, B)

Number of specimens: 24

Form: These points are all very similar in outline although the size range is considerable. The blades are narrow and triangular with straight or slightly convex edges. On about half of the specimens the edges are finely serrated. Shoulders have slight to prominent barbs. Deep side notches form expanding stems which are broad at the neck and short in relation to the blade length. The bases, which are either straight or very slightly concave, are as wide as, or wider than, the shoulders on all specimens.

Dimensions: Total length: 34 to 74 mm., average 50 mm.; shoulder width: 20 to 33 mm., average 26 mm.; width at the base: 21 to 35 mm., average 28 mm.; stem length: average 10 mm.; thickness: 5 to 7 mm.

Weight: Complete points average 6.6 gm.

Material: All the points of this variety are made of local chert ranging in quality from a fine-grained, translucent stone to a coarse, opaque grade of stone. Colors vary from tan to medium brown and from light to medium gray.

Distribution: Zone I (3), mixed Zones I and II (8), Zone II (7), Zones II and III mixed (4), Zone III (1), and provenience uncertain (1).

Remarks: All of the points in this group show excellent craftsmanship. They are very thin, with sharp, well defined edges. The total length of these points is rather uniform and most specimens are near the average total length listed above despite the variation indicated by the size range; the shortest specimen has been resharpened and the longest point is exceptionally long for the variety. This variety corresponds reasonably well to Johnson's Variety 1 (p. 21) at the Wunderlich Site.

Ensor, Variety B (Fig. 33, C, D)

Number of specimens: 18

Form: Points of this variety resemble some of the Variety A specimens with wide, straight bases and shallow side notches, but each Variety B specimen has a small U-shaped notch in the center of the base. The blades are triangular with straight edges; shoulders are pronounced and several specimens have short barbs. The stems, formed by the shallow side notches, are very broad at the neck and are usually wider than the shoulders. The bases are either straight or slightly concave.

Dimensions: Shoulder width: 27 to 35 mm.; basal width: 30 to 36 mm.; stem length is uniform and averages 8 mm.; thickness: 4 to 7 mm.; basal notch averages 4 mm. wide and 3 mm. deep.

Weight: The nearly complete specimens average 8.9 gm.

Material: Translucent amber-colored flint (1), local chert, ranging in color from light tan to medium gray (17).

Distribution: Zone II (6), Zone II mixed with some Zone I and Zone III material (8), Zone III (1), and provenience uncertain (3).

Remarks: None of the 18 specimens is complete, but judging from the more nearly complete ones the total length would average about 50 mm. Four points show use marks along the broken distal edge and one specimen has been resharpened. This variety corresponds to Johnson's *Ensor*, Variety 2 (p. 21) from the Wunderlich Site.

Ensor, Variety C (Fig. 33, E, F)

Number of specimens: 9

Form: The points which make up this variety are similar in outline to those described as Variety B, but are smaller in size. Variety C specimens are somewhat like *Frio* points in size and outline, but the bases of all Variety C specimens were straight before removal of the central notch. Blades are tri-

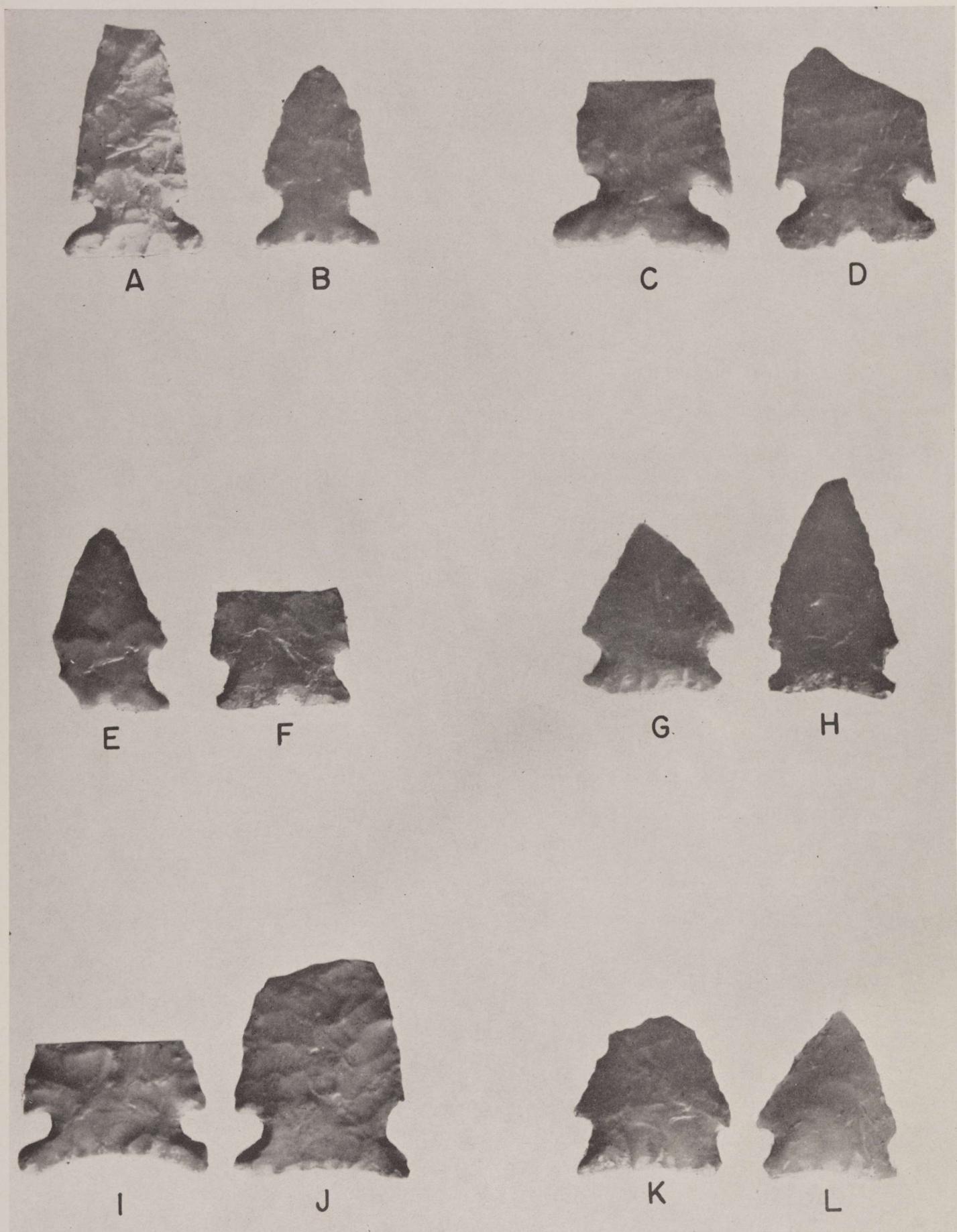


FIGURE 33. Enisor Points. A, B, Variety A. C, D, Variety B. E, F, Variety C. G, H, Variety D. I, J, Variety E. K, L, Variety F. All specimens natural size.

angular with either straight or slightly convex edges. The shoulders range from slight to pronounced; they are never barbed. The stems, formed by shallow side notches, are commonly as wide as the shoulders, and, on some specimens, are slightly wider. The most distinctive characteristic of this variety of points is the small, centrally located, U-shaped basal notch found on each specimen.

Dimensions: Total length of the complete specimen: average 34 mm.; shoulder width: 22 to 26 mm.; stem width: 23 to 26 mm.; thickness: 4 to 6 mm.; basal notch: average 4 mm. wide and 2 mm. deep.

Weight: The complete specimens average 5.7 gm.

Material: Chert. Colors vary from tan to medium brown and gray.

Distribution: Zone II (4), mixed Zones II and III (2), and provenience uncertain (3).

Ensor, Variety D (Fig. 33, G, H)

Number of specimens: 11

Form: The examples of this variety are uniform both in size and shape. The blades are short and triangular with rather steeply beveled edges. Shoulders are poorly defined on some specimens but are prominent on others; none is barbed. The short stems, which are broad at the neck, are formed by wide, shallow side notches near the base. One point has a straight base, but on all other specimens the bases are slightly concave. The central concavity tends to recurve slightly toward each side of the base, lending a rounded look at the basal corners.

Dimensions: Total length: 31 to 46 mm.; width at the shoulders: 25 to 29 mm.; basal width: 24 to 29 mm.; stem length: average about 8 mm.; thickness: average 6 mm.

Weight: Complete points average 6.9 gm.

Material: Tan to gray-brown chert (7), distinctive, opaque, black flint (1), brown flint (3).

Distribution: Zone II (5), mixed Zone I and II (1), two points with resharpened tips came from Zone III, the remaining three points came either from areas disturbed by rodents or from loose material resulting from the cleaning of profile walls within the excavation.

Ensor, Variety E (Fig. 33, I, J)

Number of specimens: 6

Form: Only a small sample of points of this variety was found at the Oblate Site. They are quite distinctive, however, when compared with other *Ensor* variants. The blades are broad and triangular with straight or slightly convex edges. Shoulders range from poorly defined to slightly barbed. The stems, short and very broad at the neck, were formed by shallow side notches beginning about 3 mm. above the base. Bases are broad, concave, and as wide as the shoulders in all specimens.

Dimensions: Maximum width: 33 to 36 mm.; stem length: average 11 mm.; thickness: 5 to 7 mm.

Weight: One nearly complete specimen weights 7.2 gm.

Material: Tan to light gray chert.

Distribution: Zone II (2), three came from levels which are

predominately Zone II but show evidence of some slight mixture with Zones I and III, and Zone III (1).

Remarks: No complete point of this variety was found. The distinctive broad bases are sharp, thin, and show evidence of secondary pressure flaking.

Ensor, Variety F (Fig. 33, K, L)

Number of specimens: 6

Form: The blades of these points are short, broad, and triangular with slightly convex edges. Well developed angular shoulders are found on five specimens while the other has slight barbs. The expanding stems are formed by broad side notches. Bases are slightly concave and not quite as wide as the shoulders.

Dimensions: Total length: 32 to 35 mm.; shoulder width: 24 to 30 mm.; base width: 21 to 29 mm.; average thickness: 5 mm.

Weight: The one complete point is 4.9 gm.

Material: Grayish-brown chert (4), reddish-brown flint (2).

Distribution: Zone II (2), Zone I and II mixed (1), Zones II and III mixed (2), provenience uncertain (1).

FAIRLAND (Fig. 34, G-I)

Number of specimens: 8

Form: The triangular blades have straight or slightly convex edges; shoulders are usually very slight; the broad, flaring stems are as wide as the shoulders; the bases are broad and deeply concave.

Dimensions: Total length: average about 40 mm.; shoulder width: 20 to 27 mm.; basal width: 19 to 27 mm.; stem length: 9 to 16 mm.; thickness: 5 to 7 mm.; basal concavity averages 4 mm. in depth.

Weight: The complete *Fairland* points average 5.2 gm.

Material: Light to medium gray chert.

Distribution: Zone II (2), Zone II mixed with either Zone I or Zone III (4), Zone III (1), provenience uncertain (1).

Remarks: This small but distinctive group of points conforms closely to the type description (Suhm *et al.*, 1954: 424, Pl. 91). Distinguishing characteristics include broad, shallow side notches and deeply concave bases. All of these specimens are thin and show fine workmanship.

FRIO (Fig. 34, A-F)

Number of specimens: 30

Form: The blades are triangular with straight or slightly convex edges. Shoulders vary from weak to strongly barbed. The stems, very short and expanding, are formed by corner notches and are commonly as wide as the shoulders. The bases vary from slightly concave to deeply concave. Basal corners are usually rounded, but a few specimens have rather sharp basal corners.

Dimensions: Total length: 22 to 63 mm., average 38 mm.; maximum width at the shoulders: 20 to 43 mm., average 24 mm.; average stem length: 8 mm.; thickness: 6 to 8 mm.

Weight: Average 6.1 gm.

Material: Dark gray-brown flint (10), chert ranging in color from light tan to dark gray (20).

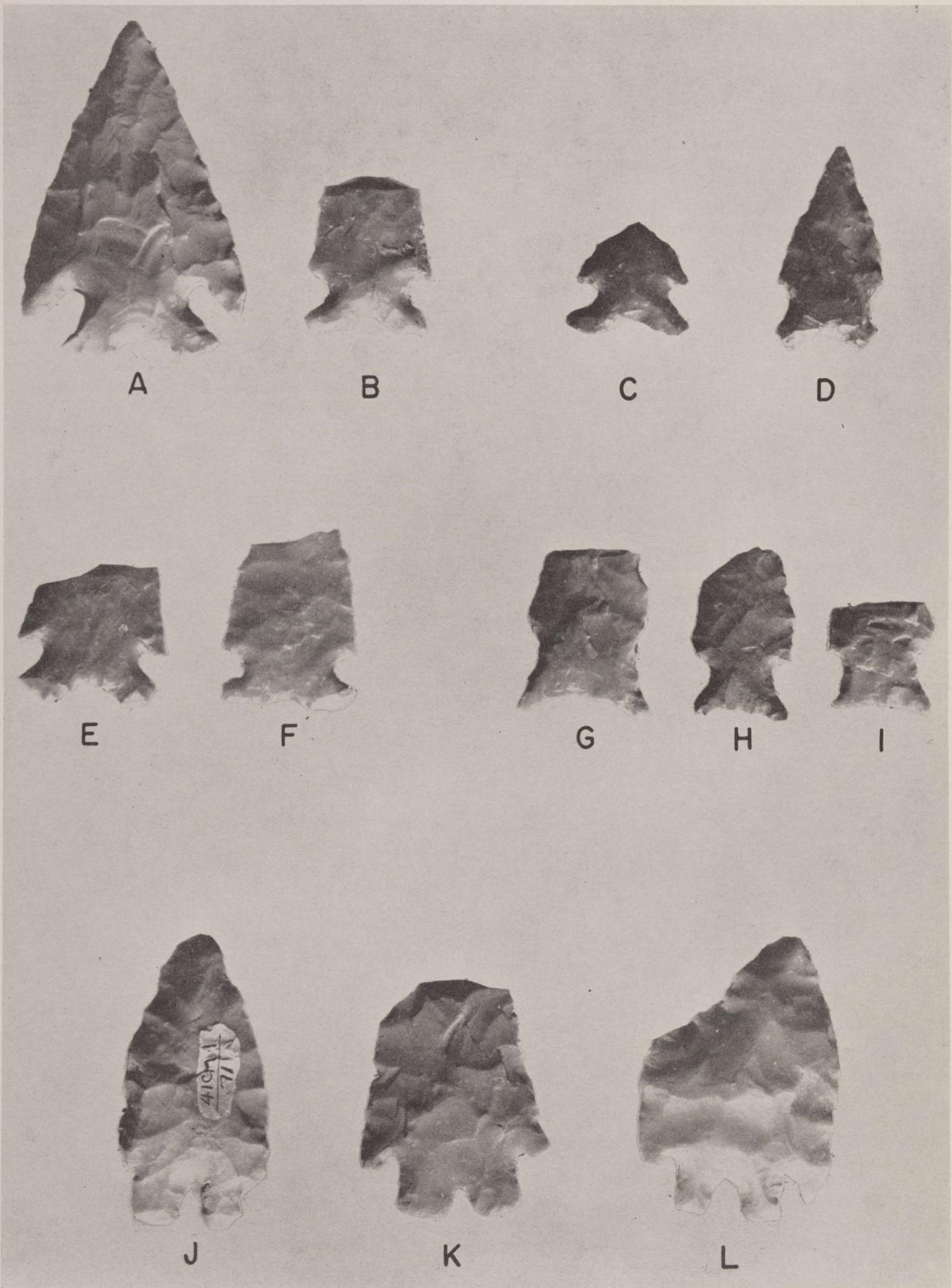


FIGURE 34. Dart Points. A-F, Frio. G-I, Fairland. J-L, Montell. All specimens natural size.

Distribution: Zone I (1), Zone III (1), provenience uncertain (2), and 26 points either occurred in pure Zone II levels or in Zone II levels showing some slight mixture with other levels.

Remarks: *Frio* is one of the most common forms found at Oblate. It constitutes a very homogeneous group which conforms to the type description (Suhm *et al.*, 1954: 428, Pl. 93) in every respect. Generally good workmanship is exhibited by these points, and several specimens show fine pressure retouching along the edges.

MARCOS (Fig. 36, G-I)

Number of specimens: 24

Form: The blades of these points are trianguloid with straight, slightly concave, or slightly convex edges. The shoulders are well barbed. The stems are short, strongly expanded, and are formed by deep corner notches which usually enter the blade at an angle of about 45°. The bases on many of the *Marcos* points are quite straight while others have somewhat convex bases and one specimen has a very slightly concave base.

Dimensions: Total length: 38 to 55 mm.; maximum width at the barbs: 23 to 39 mm.; base width: 19 to 26 mm.; average stem length: 8 mm.; thickness: 4 to 8 mm.

Weight: Complete specimens average 6.9 gm.

Material: Dark brown and gray flint (11), light tan or grayish chert (13).

Distribution: Zone I (15), mixed Zones I and II (9).

Remarks: This group of specimens resembles points of the *Marcos* type described by Suhm, Krieger, and Jelks (1954: 442, Pl. 100), except that several of the Oblate specimens are slightly smaller than the minimum size indicated (*ibid.*) for the type. The workmanship on most specimens is very good, a majority showing fine secondary pressure flaking and two specimens having very narrow, finely worked tips.

MARSHALL (Fig. 35, G, H)

Number of specimens: 4

Form: The blades are triangular with straight or convex edges. The shoulders are strongly barbed. The stems are short and either parallel-sided or slightly expanded. The bases of all four specimens are straight.

Dimensions: Average total length: 60 mm. (estimated); maximum width: 34 to 36 mm.; stem width: 17 to 20 mm.; average stem length: about 8 mm.; thickness: 5 to 9 mm.

Weight: Average of complete points is 7.1 gm.

Material: Tan to medium gray chert (4).

Distribution: Zone I (2), Zones I and II mixed (1), lower Zone II (1).

Remarks: The Oblate Site produced four dart points assignable to the *Marshall* type as defined by Suhm, Krieger, and Jelks (1954: 444, Pl. 101). Although generally smaller than the average indicated (*ibid.*), they fall within the range of variation. Their stems are especially typical.

MONTELL (Fig. 34, J-L)

Number of specimens: 11

Form: The blades are triangular with straight or convex edges.

The shoulders are poorly to well barbed, while the stems are very short and expanded slightly toward the base. The bases, which are bifurcated by deep notches, are the most distinctive attribute of this type. Nine specimens have V-shaped notches in the center of the base, while the other two have deep U-shaped basal notches.

Dimensions: Total length: 56 to 61 mm.; maximum width: 33 to 40 mm.; stem width at the base: 20 to 25 mm.; stem length: 7 to 14 mm.; thickness: 6 to 9 mm.; average depth of the basal notch: 5 mm.

Weight: The average weight of the complete specimens is 15.6 grams, making these specimens the heaviest projectile points recovered from the site.

Material: Light tan chert (6), brown chert (5).

Distribution: Zone I (3), Zones I and II mixed (2), Zone II (5), rodent burrow (1).

Remarks: Each of the *Montell* points is well within the range of variation listed for the type by Suhm, Krieger, and Jelks (1954: 452, Pl. 105). These points are rather thick and crude, and seem to have been shaped primarily by percussion.

PEDERNALES (Fig. 35, D-F)

This group of points resembles the *Pedernales* type as defined by Suhm, Krieger, and Jelks (1954: 468, Pl. 113-115). Morphologically, however, they can be separated into three varieties, each with its own rather distinctive characteristics. Points of the first variety, A, are narrow in relation to their total length, have slight shoulders, and concave bases; the second variety, B, consists of broad points with barbs and deeply concave bases; the third variety, C, is composed of short, broad points with barbs and deeply concave bases. Variety A corresponds in most respects to Johnson's Variety 2 (herein, p. 25) from the Wunderlich Site, while Variety B resembles—but is not identical to—Johnson's Variety 1 (p. 25).

Pedernales, Variety A (Fig. 35, F)

Number of specimens: 3

Form: These points have narrow, triangular blades with straight edges. The shoulders are very slight and poorly developed. Stems are rectanguloid with straight, parallel edges. The bases of all specimens are concave.

Dimensions: Total length: 41 to 67 mm.; maximum width: 20 to 28 mm.; stem width: 16 to 22 mm.; stem length: 17 to 22 mm.; thickness: 6 to 7 mm.

Weight: The complete specimen is 14.2 gm.

Material: Dark gray, translucent flint (3).

Distribution: Zone I (2), provenience uncertain (1).

Remarks: All three are basally thinned by the removal of several small flakes from each face.

Pedernales, Variety B (Fig. 35, D)

Number of specimens: 2

Form: These two points have broad, triangular blades with straight or slightly concave edges. The shoulders are in the form of a right angle. The rectanguloid stems have mildly

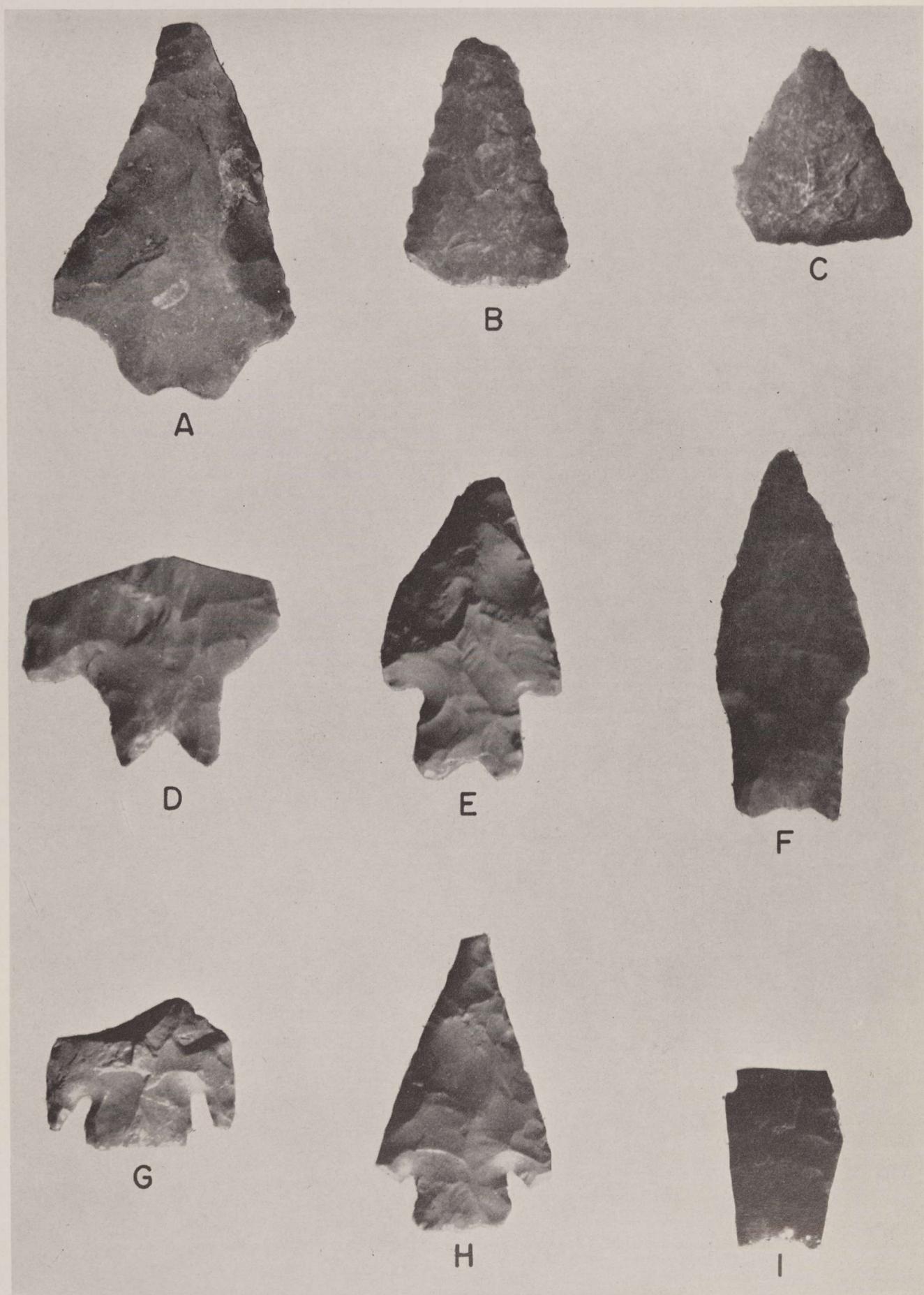


FIGURE 35. Spear and Dart Points. A, Almagre. B, C, Tortugas. D, Pedernales, Variety B. E, Pedernales, Variety C. F, Pedernales, Variety A. G, H, Marshall. I, Angostura. All specimens natural size.

concave or convex edges which are approximately parallel on one specimen, but which converge slightly toward the base on the other. The bases are deeply concave.

Dimensions: The tips of both points are missing, making it impossible to determine total lengths. Maximum width at the shoulders: 35 and 48 mm.; stem width: 20 and 22 mm.; stem length: 20 and 17 mm.; depth of the basal concavity: 10 and 6 mm.; thickness 6 and 9 mm.

Weight: Specimens too incomplete to be determined.

Material: Light gray chert.

Distribution: Lower Zone I (2).

Pedernales, Variety C (Fig. 35, E)

Number of specimens: 5

Form: The blades of these points are broad and triangular with straight, slightly concave or slightly convex edges. The shoulders are barbed, ranging from poorly to well developed. The stems are slightly expanding with straight or convex edges and the bases are deeply concave.

Dimensions: Total length: 50 to 54 mm.; maximum width 33 to 38 mm.; stem width: 18 to 20 mm.; stem length: 11 to 16 mm.; thickness: 6 to 8 mm.

Weight: Complete specimens average: 12.2 gm.

Material: Chert ranging in color from light tan and gray to medium brown (4), and dark brown flint (1).

Distribution: Zone I (3), Zone II (1), provenience uncertain (1).

PAISANO (Fig. 36, F)

Number of specimens: 1

Form: The blade is trianguloid with convex edges. A very slight shoulder can be detected on one side of the point only. The stem, formed by very broad and shallow side notches, is short and flaring, and it is wider than the blade and shoulder sections. The base is concave.

Dimensions: Total length: 40 mm.; basal width: 17 mm.; thickness: 4 mm.

Weight: 3.8 gm.; this is the lightest dart point found at the site.

Material: Banded, medium gray chert.

Distribution: Zone III.

Remarks: This dart point conforms to the *Paisano* type in all morphological details (Suhm *et al.*, 1954: 460, Pl. 109). Points of the *Paisano* type are common only in the Big Bend area of Texas, however, and the resemblance of the Oblate specimen may be coincidental.

TORTUGAS (Fig. 35, B, C)

Number of specimens: 2

Form: Simple, broad triangular outlines. Blade edges are either straight or very slightly convex. The bases are thin, sharp, and slightly convex.

Dimensions: Length: 44 and 23 mm.; maximum width: 30 and 38 mm.; thickness (both specimens): 5 mm.

Material: Both are made of a translucent dark gray flint of a fine quality rarely found at this site.

Distribution: One occurred in an area disturbed by rodents and

the other was recovered from a level showing mixture of Zones II and III.

Remarks: Both specimens are patinated on both faces. The smaller one is alternately beveled along the right blade edge on each face when the artifact is oriented with base downward.

Miscellaneous Unidentified Dart Points

These points, 18 in number, are for the most part either crudely made or asymmetrically shaped. Each specimen generally resembles one or more of the types previously described, but is much too variant to be included within a particular type. No vastly different shapes, sizes, or degrees of workmanship are indicated by members of this group. Four are made of dark brownish flint and the others are made of the locally occurring gray and brown chert. Four points were found in mixed Zones I and II, four in Zone II, four in mixed Zones II and III, one in Zone III, and the remaining five occurred in areas showing rodent disturbance. Complete specimens in this group average 7.5 grams in weight.

Dart Point Fragments

Seventy-nine unclassified fragments complete the inventory of dart points from the Oblate Site excavation. As far as can be determined, no types other than those described above are represented by these fragments. Twenty-five of the fragments were subjected to fire or intense heat subsequent to their manufacture, and as a result are badly scarred by "potlids." Black flint was used to make one point; all other fragments are made from a rather fine-grained chert ranging in color from tan and light gray to medium brown and dark gray. Seven fragments were found in Zone I, mixed Zones I and II (16), Zone II (13), mixed Zones II and III (16), Zone III (16), and provenience uncertain (11).

Arrow Points

Specimens classed in the arrow point category were found heavily concentrated in the upper one foot of the midden deposits, Zone III. They average 30 mm. in length, 15 mm. in width, 3 mm. in thickness, and 1.21 grams in weight. Four types are recognized: *Clifton*, *Granbury*, *Pedriz*, and *Scallorn*.

CLIFFTON (Fig. 36, C, D)

Number of specimens: 8

Form: The blades are roughly triangular but all the specimens are asymmetrically shaped. The angular shoulders range from very slight to pronounced. Stems are very short and

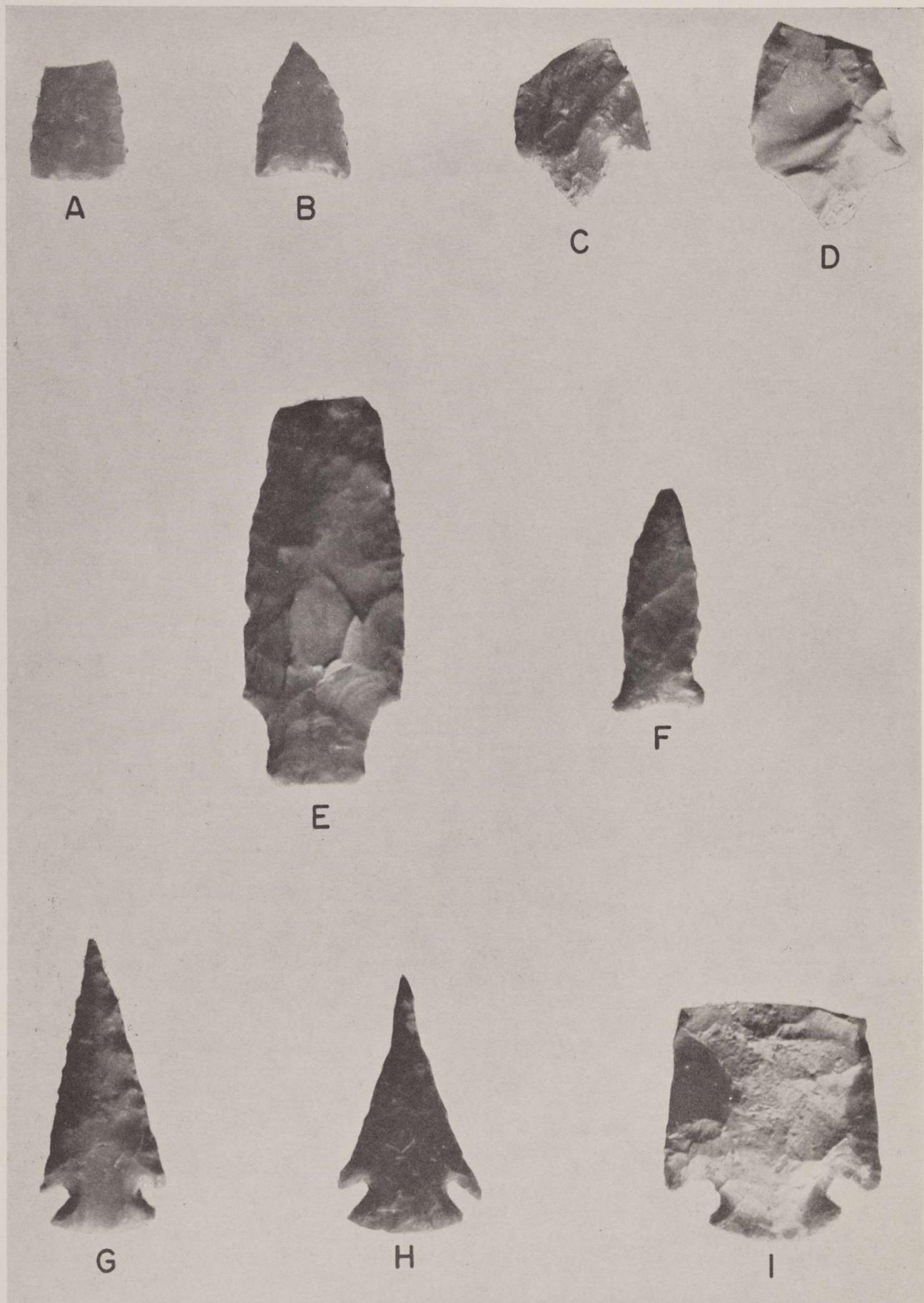


FIGURE 36. Arrow and Dart Points. A, Granbury. B, Unclassified arrow point. C, D, Cliffton. E, Bulverde. F, Paisano. G-I, Marcos. All specimens natural size.

Table 4.
Distribution of Arrow Points by Zone
and Depth.

Type	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Provenience uncertain	Totals
Cliffton	--	--	--	--	7	1	8
Granbury	--	--	--	1	1	1	3
Perdiz A	--	--	--	1	19	10	30
Perdiz B	--	--	--	--	3	1	4
Scallorn A	--	--	--	4	18	2	24
Scallorn B	--	--	--	4	13	2	19
Misc. & Fragmentary	--	--	--	7	24	5	36
TOTALS	0	0	0	17	85	22	124
	2.0'- 2.5'	1.5'- 2.0'	1.0'- 1.5'	0.5'- 1.0'	0.0'- 0.5'	Provenience uncertain	
Cliffton	--	--	--	--	7	1	8
Granbury	--	--	--	1	1	1	3
Perdiz A	--	--	--	3	17	10	30
Perdiz B	--	--	--	--	3	1	4
Scallorn A	--	--	3	11	8	2	24
Scallorn B	--	--	2	9	6	2	19
Misc. & Fragmentary	--	--	2	8	21	5	36
TOTALS	0	0	7	32	63	22	124

contracting with convex edges. Bases are either rounded or poorly pointed.

Dimensions: Total length: 38 mm. on the only complete specimen; maximum width: 13 to 29 mm.; stem width at the neck: 8 to 15 mm.; stem length: 3 to 10 mm.; thickness: 3 to 5 mm.

Weight: Average weight of the complete specimens: 3.2 gm.

Material: Dark reddish opaque flint (2), gray to tan chert (6).

Distribution: Zone III (7), surface (1).

Remarks: All of the *Cliffton* are made from partially retouched flakes. None is completely bifacially chipped, although a majority show some fine pressure flaking along the edges of both faces.

GRANBURY (Fig. 36, A)

Number of specimens: 3

Form: Simple triangular points with straight to slightly convex lateral edges. The bases vary from nearly straight to slightly convex. Corners of the base, however, are consistently rounded.

Dimensions: Total length cannot be determined. Maximum width: 18 to 23 mm.; thickness: 3 to 5 mm.

Weight: Specimens too incomplete to be determined.

Material: Reddish chert (1), dark brown flint (1); one badly burned and original material impossible to identify.

Distribution: Mixed Zone II and III (1), Zone III (1), rodent disturbed (1).

Remarks: These three points correspond in all details to Jelks' (1962: 35-36) recently defined *Granbury* points. Specifi-

cally, they can be identified as belonging to his *joshua* variety.

PERDIZ (Fig. 37, A-H)

These arrow points fit the type description for *Perdiz* (Suhm *et al.*, 1954: 504, Pl. 131, C-E). In the Oblate specimens it is possible to sort the *Perdiz* into two apparent varieties. Neither of these varieties, however, agrees with those recently recognized by Jelks (1962: 24-26) at the Kyle Site. One variety from Oblate, here called Variety A, consists of relatively long and narrow points with long, narrow, contracting stems (Fig. 37, A-E). The other, Variety B, is represented by four rather broad specimens which have short, broad, contracting stems (Fig. 37, F-H). In addition to the size differences between the two varieties there is also a slight difference in workmanship: Variety B specimens are more crudely flaked and have less well defined shoulders than do the points of Variety A. No differences in horizontal or vertical distribution were detected. Points of the *Perdiz* type occurred primarily in soil Zone IIIb, from the surface to six inches in depth, and were concentrated in and around some large lenses of white ash beneath the overhang.

Perdiz, Variety A (Fig. 37, A-E)

Number of specimens: 30

Form: The blades are triangular and the edges are straight in most specimens; in a few examples the blade edges are slightly concave or slightly convex. Twenty have finely serrated blade edges. All of these points range from slightly barbed to well barbed. The stems—triangular and contracting with convex edges—represent 1/5 to 1/2 the total length of the points with the average falling at 1/4 the total length. The stems are pointed.

Dimensions: Total length: 23 to 50 mm., average: 37 mm.; maximum width at the barbs: 11 to 22 mm., average: 14 mm.; stem width at the neck: 5 to 9 mm., average: 7 mm.; stem length: 4 to 16 mm., average: 9 mm.; thickness: 2 to 4 mm.

Weight: The complete specimens average 0.8 gm.

Material: Dark reddish-brown flint (8), tan to gray chert (22).

Distribution: Zones II and III mixed (1), Zone III (19), levels disturbed by rodent burrows (10).

Remarks: Eleven points of this variety are bifacially chipped. The other 19 specimens are chipped completely across on only one face; the reverse face, representing the smooth plane of the original flake, shows only very fine pressure flaking along the edges. None of these points shows evidence of having been burned.

Perdiz, Variety B (Fig. 37, F-H)

Number of specimens: 4

Form: The blades are triangular with straight to convex edges. The shoulders are slightly barbed. The stems are contracting

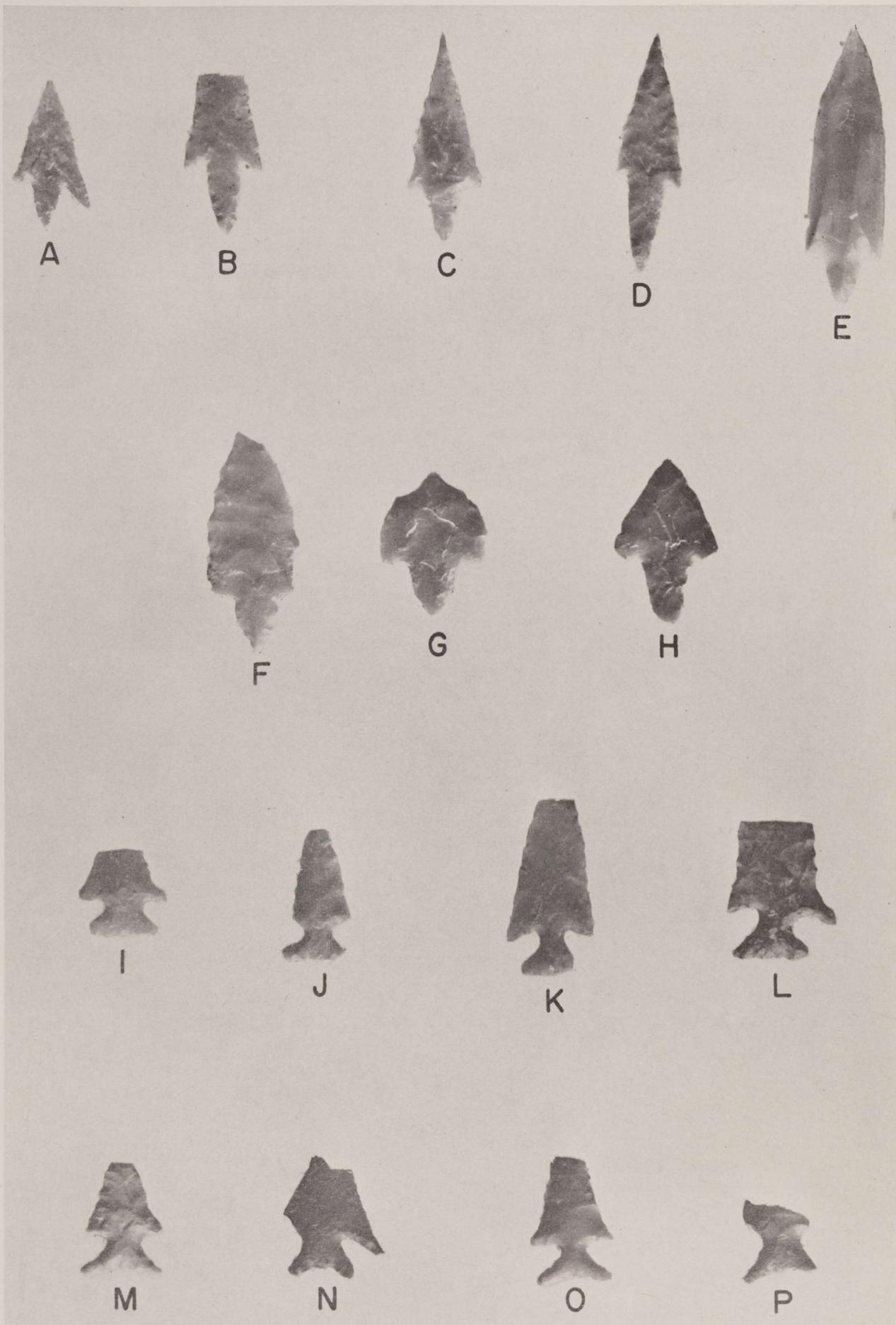


FIGURE 37. Arrow Points. A-E, *Perdiz*, Variety A. F-H, *Perdiz*, Variety B. I-L, *Scallorn*, Variety A. M-P, *Scallorn*, Variety B. All specimens natural size.

with convex edges and pointed bases. The stems range from 1/3 to 1/4 the total length of the points.

Dimensions: Total length: 31 to about 42 mm.; width at the shoulders: uniformly about 20 mm.; stem width at the neck: 8 to 10 mm.; stem length: 10 to 11 mm.; thickness: 3 to 4 mm.

Weight: Average: 2.3 gm.

Material: Dark reddish opaque flint (1), gray chert (3).

Distribution: Zone III (3), surface (1).

Remarks: Two specimens are bifacially flaked, while the other two are chipped completely across one face but only around the edges of the other face. None has been burned.

SCALLORN (Fig. 37, I-P)

Two varieties of expanding stem arrow points are included under the *Scallorn* type (Suhm *et al.*, 1954: 506, Pl. 132: A, B, and C). The two varieties are distinguished on the basis of stem shape only; in all other characteristics they form a very homogeneous type. Variety A points have expanding stems with straight edges and essentially straight bases. Variety B points have strongly expanding stems with slightly convex edges and markedly concave bases. The provenience of the two varieties is almost identical.

Scallorn, Variety A (Fig. 37, I-L)

Number of specimens: 24

Form: Points of this variety have triangular blades, straight or slightly concave edges which are often finely serrated, and well-barbed shoulders. The stems are formed by deep corner notches and are thus very strongly expanding and narrow at the neck. Stem edges tend to be straight. The bases—only one of which is as wide as the shoulders—are straight in 20 specimens and slightly concave in the other four.

Dimensions: Total length: about 25 to 40 mm., average: 30 mm.; width at the barbs: 12 to 21 mm., average: 16 mm.; neck width: 4 to 7 mm.; basal width: 8 to 14 mm., average: 12 mm.; average stem length: about 8 mm.; average thickness: 3 mm.

Weight: The complete specimens average 1.2 gm.

Material: Dark gray flint (4), gray and tan chert (20).

Distribution: Zone III (18), Zones III and II mixed (4), disturbed area (2).

Remarks: Seventeen specimens are completely flaked on both faces; seven show traces of the original flake surface on one face. Two have been burned. This variety corresponds to Jelks' (1962:30) newly defined *sattler* variety of the *Scallorn* type.

Scallorn, Variety B (Fig. 37, M-P)

Number of specimens: 19

Form: The blades are triangular with concave edges. The blades of four points are asymmetrical, apparently having been resharpened along one edge. Shoulders are angular or have well-formed barbs. The stems, formed by deep corner notches, are strongly expanding with straight or convex edges. On all specimens the base is deeply concave.

Dimensions: Total length: 16 mm., on reworked specimens, to 31 mm., average: about 25 mm.; width at the shoulders: 15 to 21 mm.; stem width: 9 to 15 mm., average: about 13 mm.; stem length: 6 to 9 mm.; average thickness: about 3 mm.

Weight: Complete specimens average 1.0 gm.

Material: Translucent dark brown flint (5), tan to medium gray chert (14).

Distribution: Mixed Zones II and III (2), Zone III (9), provenience uncertain. (2).

Remarks: Five specimens show traces of the original flake surfaces on one face. Three have been subjected to fire or heat.

Miscellaneous Unclassified Arrow Points

Eight arrow points cannot be classified. For the most part, these appear to be either poorly shaped or incomplete specimens. One triangular form (Fig. 36, B) with a concave base resembles the *Fresno* type, except that it is more crudely made and thicker than is typical of that type. It may possibly have been refashioned from the tip end of a larger point or a knife. The remaining specimens have poorly formed stems ranging from contracting to expanding in outline. Three arrow points are flaked completely on only one face and five are bifacially chipped. Two specimens are made of brown flint and the other six of the usual chert which varies in color from brown to medium gray. All of the points in this group fall easily within the size ranges listed for the arrow point types above. Their provenience is as follows: Zone III (5), uncertain (3). The complete specimens average 1.1 grams in weight.

Knives

A total of 299 artifacts is included in this general classificatory group. All are bifacially chipped, relatively long in relation to their width, pointed to a greater or lesser degree on one or both ends, and have no stems, notches, or basal grinding. In size and outline, however, specimens in this category vary tremendously. They are grouped together primarily for descriptive reasons and no functional similarity is necessarily implied.

On the basis of size and outline, the knives can be separated into 13 rather distinctive forms. All of the more fragmentary specimens are included in two additional unclassified groups.

FORM A (Fig. 38, A, B)

Long, Triangular, Convex-base Knives

Number of specimens: 11

Form: These knives are relatively small in size. They are long and triangular in outline with straight or convex edges and either straight or convex bases. The base forms sharp angles with the edges on every specimen. The bases of five speci-

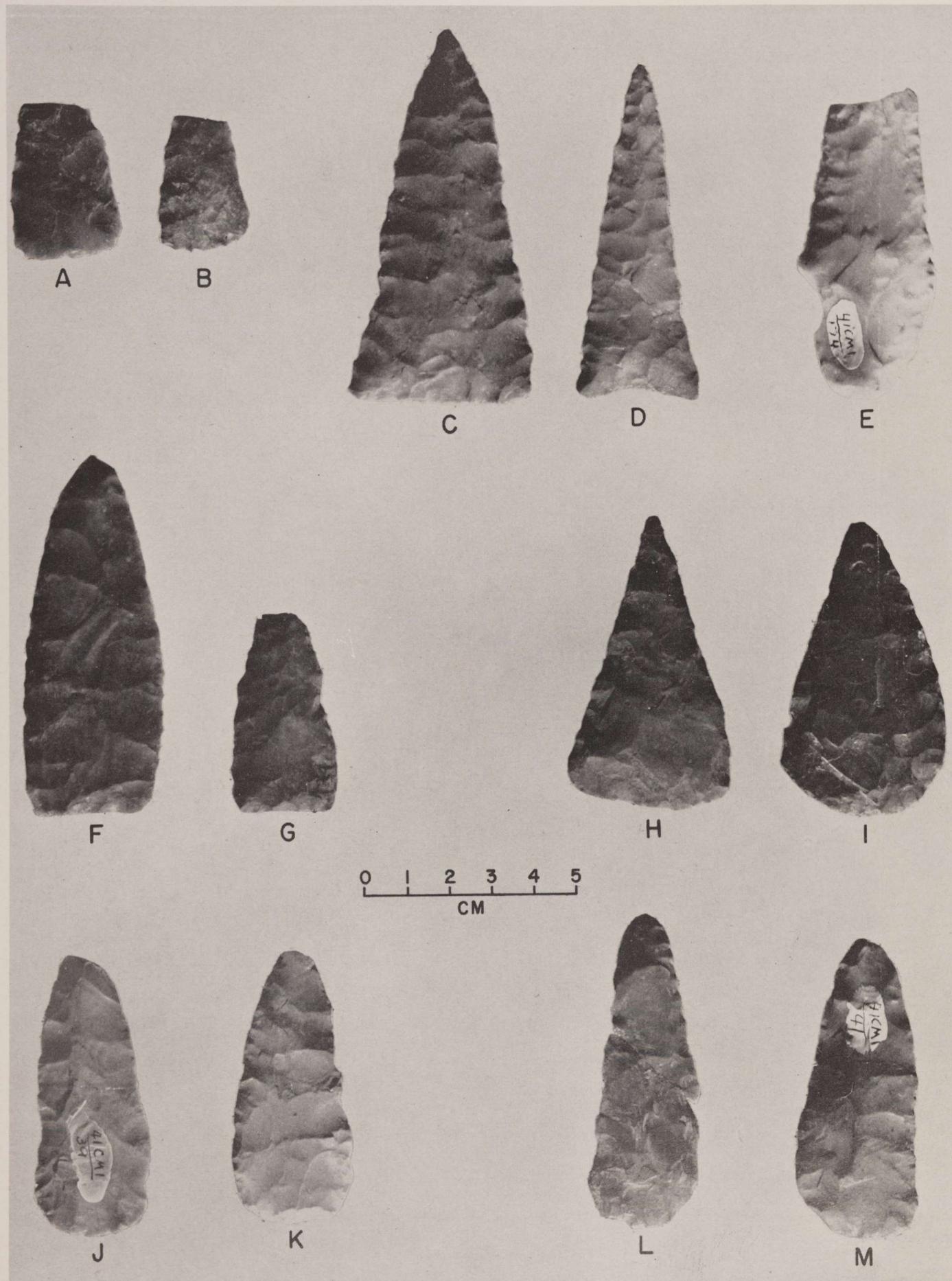


FIGURE 38. Knives. A, B, Form A. C, D, Form B. E, Form H. F, G, Form C. H, I, Form D. J-M, Form E.

mens have been thinned by the removal of from four to six parallel flakes on both faces of the artifact. The more complete specimens have well pointed tips.

Dimensions: Total length: 40 to 55 mm., average: 43 mm.; maximum width: 19 to 25 mm.; thickness: 4 to 7 mm.

Material: One specimen is made of dark brown flint, and all others are made of chert ranging in color from tan to dark gray.

Distribution: Zone II (5), mixed Zones II and III (1), Zone III (5).

FORM B (Fig. 38, C, D)

Long, Triangular, Concave-base Knives

Number of specimens: 4

Form: These long triangular knives have straight, slightly concave, or slightly convex edges. The bases vary from almost straight to concave; these are thin, carefully flaked artifacts showing some basal thinning. Blade tips are very sharply pointed.

Dimensions: Length: 55 to 84 mm.; maximum width: 28 to 43 mm.; thickness: 5 to 9 mm.

Material: Tan to brown-colored chert.

Distribution: Zone II (2), mixed Zones II and III (1), rodent disturbance (1).

FORM C (Fig. 38, F, G)

Long, Triangular, Straight-base Knives

Number of specimens: 4

Form: These knives are long, narrow, and trianguloid, with convex edges and straight bases. They seem to have been shaped primarily by percussion but each specimen has fine secondary pressure flaking along the edges. The tips are rounded on the complete specimens.

Dimensions: Length: 52 to 81 mm.; maximum width: 24 to 32 mm.; thickness: 6 to 8 mm.

Material: Dark gray flint (1), and brownish chert (3).

Distribution: Mixed Zones I and II (1), Zone II (2), provenience uncertain (1).

FORM D (Fig. 38, H, I)

Long, Concave-edge Knives

Number of specimens: 11

Form: These long triangular knives have recurved blade edges, i.e., concave edges in the form of an obtuse angle, and narrow, sharp tips. The bases are convex, and basal corners are rounded. These knives are thin and well shaped.

Dimensions: Length: 54 to 67 mm. on complete specimens; maximum width: 32 to 45 mm.; thickness: uniformly 8 mm.

Material: All the specimens are made of light gray chert.

Distribution: Zone I (1), mixed Zones I and II (2), Zone II (2), mixed Zones II and III (2), Zone III (1), provenience uncertain (3).

FORM E (Fig. 38, J-M)

Thin, Precussion-flaked Knives

Number of specimens: 16 fragments (8 restored specimens).

Form: These thin blades have irregular convex edges and rounded points. The bases are convex, without distinct corners separating them from the blade edges. They are shaped primarily by the removal of large flakes; there is little or no evidence of fine secondary pressure flaking along the edges.

Dimensions: Length of the large specimen: 85 mm.; others average 65 mm.; maximum width of the large specimen: 34 mm.; other seven specimens average 27 mm.; thickness: uniformly about 6 mm.

Material: Chert ranging in color from tan to gray (7), dark gray translucent flint (1).

Distribution of the unrestored fragments: Zone I (1), Zone II (1), Zones II and III mixed (1), Zone IIIa (3), and Zone IIIb (10). Eight complete specimens were restored from the 16 fragments. The two fragments from the lower zones (I and II) were found to fit pieces from Zone III to form complete specimens. Therefore, because of the overwhelming occurrence of knives of this type in Zone III (it is feasible that the two fragments mentioned above could have been carried downward in undetected rodent disturbances) this distinctive artifact is considered to be a Zone III type.

Remarks: These specimens form one of the most homogeneous groups of artifacts recovered from the Oblate Site excavation. They correspond closely to a form which Jelks (1962: 44) has referred to as *Cleburne knives* and which he suggests is a trait of the Central Texas Aspect (both Toyah and Austin foci). Seven of the eight restored knives from Oblate are virtually identical in both shape and size; the other specimen has the same outline but is slightly larger. Each specimen is broken almost exactly across the center in a surprisingly similar fashion. Perhaps these breaks resulted either from a characteristic manner of use, or from a particular mode of hafting. Eight specimens resulted from the matching-up in the laboratory of tips and basal fragments. In many cases the matching tips and bases were found in different grid squares. The provenience of Knife E fragments, rather than restored specimens, is shown in Table 5. In three specimens the matching halves are different in color due to varying degrees of weathering subsequent to breakage.

FORM F (Fig. 39, A, B)

Rounded Base Knives

Number of specimens: 10

Form: While very similar to Form E knives in both size and general outline, these knives tend to be more symmetrical, with more carefully worked edges. Tips are well sharpened and bases are rounded with fairly well defined shoulders. Large flake scars, which were not removed by the secondary flaking, appear on one face of these specimens.

Dimensions: Length 44 to 64 mm.; maximum width: 25 to 34 mm.; thickness: 6 to 9 mm.

Material: One specimen is made of dark brown flint and the others are all derived from grayish-colored chert.

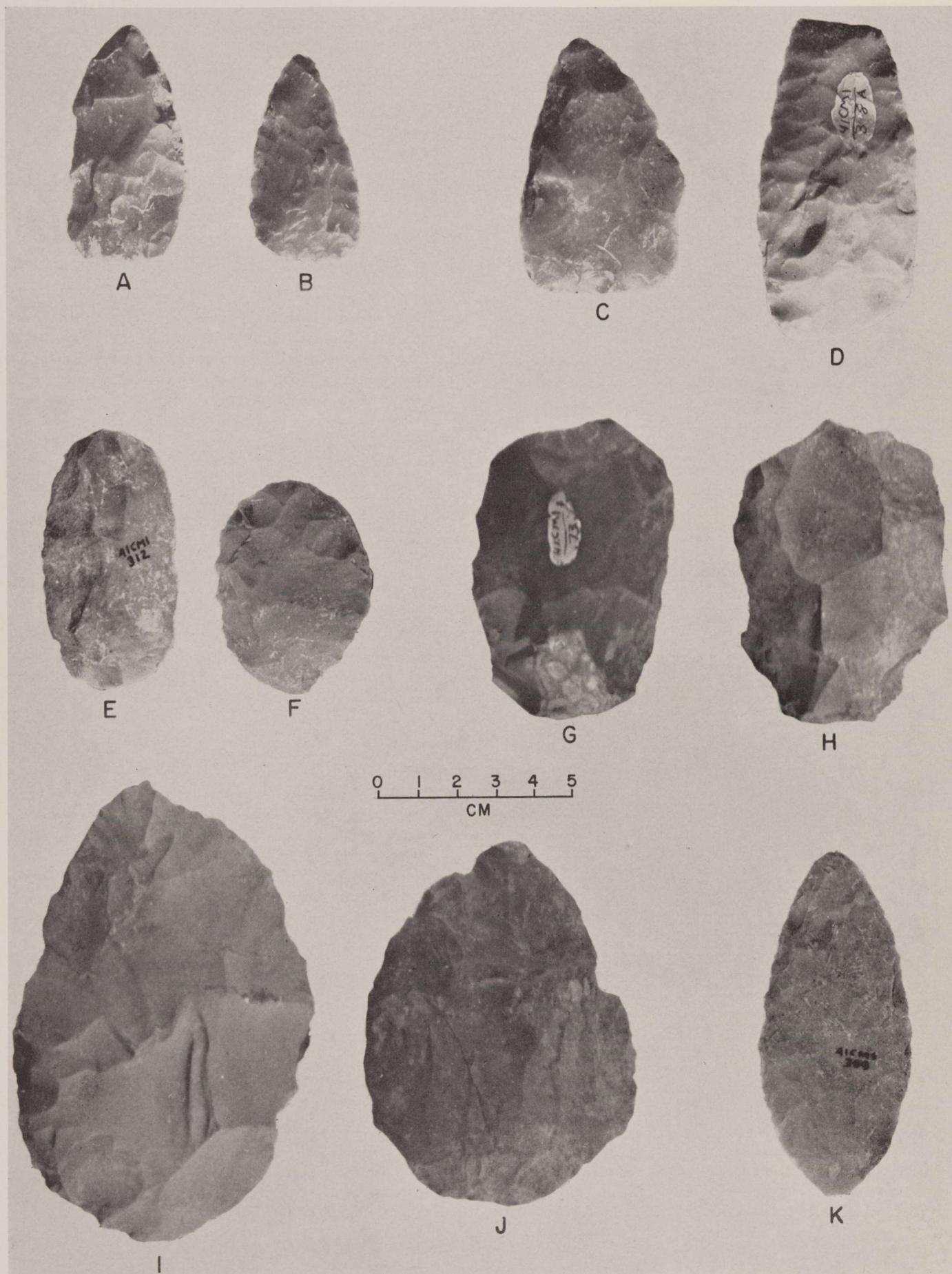


FIGURE 39. Knives. A, B, Form F. C, D, Form G. E, F, Form K. G, H, Form J. I, J, Form I. K, Form L.

Distribution: Zone I (1), mixed Zones I and II (2), Zone II (3), mixed Zones II and III (1), and Zone III (3).

FORM G (Fig. 39, C, D) Miscellaneous Trianguloid Knives

Number of specimens: 23

Form: This is a residual category containing artifacts which cannot be classified with any of the preceding types, and yet which are not markedly dissimilar from those forms. All of these specimens can be oriented to show a broad basal end and a narrow tip, or, in other words, they are either triangular or tear-drop shaped in outline. The blade edges are convex on all specimens, and bases range from well rounded to almost straight. The thickness is fairly uniform on all specimens.

Dimensions: Except for thickness, the variation in size is considerable. Total length: 42 to 92 mm.; maximum width: 30 to 55 mm.; thickness: 9 to 13 mm.

Material: All specimens are made of chert. The colors range from various shades of light gray to medium brown.

Distribution: Zone II (2), mixed Zones I and II (1), Zone II (7), mixed Zones II and III (4), Zone III (5), and provenience uncertain (4).

Table 5.
Distribution of Knives by Zone.

Type	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Provenience uncertain	Totals
Knife A	--	--	5	1	5	--	11
Knife B	--	--	2	1	--	1	4
Knife C	--	1	2	--	--	1	4
Knife D	1	2	2	2	1	3	11
Knife E	1	--	1	1	13	--	16
Knife F	1	2	3	1	3	--	10
Knife G	2	1	7	4	5	4	23
Knife H	--	--	--	--	2	--	2
Knife I	2	4	5	2	1	2	16
Knife J	1	4	6	2	4	1	18
Knife K	--	--	1	2	--	--	3
Knife L	--	--	--	--	--	2	2
Knife M	2	6	14	8	9	4	43
Misc. & Fragmentary	13	31	33	15	31	13	136
TOTALS	23	51	81	39	76	29	299

FORM H (Fig. 38, E) Alternately Beveled Knives

Number of specimens: 2

Form: Two knives with alternately beveled blade edges were found. Both are incomplete. The more complete specimen has a long narrow blade with one beveled edge on each face. The blade edges are straight. The base is rounded, without beveled edges. The more fragmentary knife has straight edges with a steeply beveled edge on each face. When these

specimens are oriented with the tips upward, each face is beveled along the left edge only.

Dimensions: Maximum width of one specimen: 32 mm.; thickness: 7 and 8 mm.; estimated length of the more complete specimen: 95 mm.

Material: One specimen is made of a distinctive white flint and the other of dark gray-brown flint.

Distribution: Both specimens came from Zone III, and both lay within six inches of the deposit surface.

FORM I (Fig. 39, I, J) Large Ovoid Knives

Number of specimens: 16

Form: These specimens are large ovoid bifaces with some evidence of a point appearing on one end. They were apparently shaped by the removal of large flakes by percussion. The edges are convex and the bases are rounded. No clear basal corners are discernible. Tips vary from poorly to fairly well sharpened. Surface patina of the original stone nodule appears on one face of five specimens.

Dimensions: Total length: 77 to 122 mm.; maximum width: 53 to 80 mm.; thickness: 13 to 29 mm.

Material: Five specimens are made of dark brown flint and the others are made of the usual brownish gray chert.

Distribution: Zone I (2), mixed Zones I and II (4), Zone II (5), mixed Zones II and III (2), Zone III (1), and rodent disturbances (2).

Remarks: The knives of this group are markedly thicker and more crudely worked than categories A-H.

FORM J (Fig. 39, G, H) Small Core Knives

Number of specimens: 18

Form: These small bifacially flaked core knives are oval to almost circular in outline. All have been shaped by the removal of large flakes, and the edges are very ragged and uneven, exhibiting no evidence of secondary pressure flaking. Eleven specimens show a trace of the surface patina of the original nodule on one face.

Dimensions: Total length: 55 to 90 mm.; maximum width: 47 to 70 mm.; thickness: 16 to 34 mm.

Material: All specimens are made of gray to brown chert ranging from fine to rather coarse grained in texture.

Distribution: Zone I (1), mixed Zone I and II (4), Zone II (6), mixed Zone II and III (2), Zone III (4), provenience uncertain (1).

FORM K (Fig. 39, E, F) Smoothly-flaked Oval Knives

Number of specimens: 3

Form: These bifacially flaked knives are oval in outline and lenticular in cross section. They are not pointed at either end, but they are carefully flaked and have smooth, sharp edges. The edges show some evidence of secondary pressure flaking.

Dimensions: Length: 62 to 78 mm.; width at center: 40 to 49

mm.; maximum thickness: 18 to 25 mm.

Material: Light gray chert.

Distribution: Zone II (1), mixed Zones II and III (2).

FORM L (Fig. 39, K) Long, Thin, Leaf-shaped Knives

Number of specimens: 2

Form: These specimens are long and leaf-shaped with a point at each end. The blade edges are smoothly convex. These knives were shaped primarily by percussion, but they are thin and well made. One specimen is fragmentary.

Dimensions: Length: 105 mm.; width (at widest point near the center): 46 mm.; thickness: 7 to 8 mm.

Material: Gray to tan chert.

Distribution: Zone III (2).

FORM M Large Core Knives

Number of specimens: 43

Form: This group of artifacts, all of which are relatively large and thick, have one characteristic in common: a heavily patinated nodular surface (from the original source cobble) covering from 25 to 75 percent of the artifact. All have been bifacially sharpened along one or two edges, presumably as a source for thin flakes. The alteration of these nodules rendered them serviceable as chopping or crude cutting implements—for which some were obviously employed as shown by use-wear along the sharp edges. The shapes are determined largely by the outline of the original nodule and therefore exhibit considerable variation. The worked edges are crudely formed and irregularly shaped.

Dimensions: Thickness: 25 to 80 mm.; maximum diameter: 142 mm.

Material: One specimen is of dark brown flint, and the remainder are made of locally occurring chert nodules. The freshly chipped surfaces range in color from light gray to medium brown while the patinated crusts of the nodules are tan, brown, or orange-red.

Distribution: Zone I (2), mixed Zone I and II (6), Zone II (14), mixed Zones II and III (8), Zone III (9), provenience uncertain (4).

Remarks: One specimen in this category is a fine example of a well shaped nodular chopper or fist axe. It is heavily patinated over the flaking scars and (since no other heavily patinated artifacts were found in the excavation) is apparently intrusive in the site.

Knife Fragments

The 136 specimens in this group are too fragmentary to be identified with any of the foregoing groups. Meaningful dimensions are largely undeterminable. All specimens perhaps would, if complete, fall within one or more of the previously described categories and no different types are indicated. Fourteen specimens are made of dark translu-

cent flint, all others are of the common gray and brown, locally occurring chert. Eight specimens were found in Zone II and III mixed, 21 in Zone III, and 11 from either the surface of the deposit or from areas which cannot be confidently assigned to a specific zone.

Projectile Point or Knife Tips

All of these 148 specimens are triangular shaped, distal end fragments. Sizes range from very thin tips, apparently from arrow points, to large thick fragments from dart points and knives. Eighteen are made of rather fine-grained flint, one of clear quartz, and the remainder are of chert. Distribution: Zone 1 (16), mixed Zones I and II (17), Zone II (21), mixed Zones II and III (16), Zone III (49), uncertain (29).

Scrapers

A total of 386 unifacially chipped artifacts, apparently used for scraping purposes, was found at the Oblate Shelter. Ten forms are recognized in this group of specimens and are described in detail in the following section. Letter designations for the forms, followed by a descriptive name, are used in lieu of type names. A detailed comparison of scrapers from related archeological sites would perhaps produce type descriptions and type names for some of the scraper forms. Unfortunately such a study is beyond the scope of this paper.

FORM A (Fig. 40, A, B) Discoidal Scrapers

Number of specimens: 12

Form: All of these artifacts are approximately round in outline and are made from large, thick flakes. One face of each specimen, representing the removal flake scar, is smooth and shows a large positive bulb of percussion. The reverse side is marked by numerous small flake scars forming the scraper bit. One specimen is flaked completely around the circumference of the flake; all others are flaked for about three-quarters of the circumference with the thick bulb of percussion remaining unaltered. Six specimens have varying amounts of cortex from the original source material remaining on the flaked face.

Dimensions: Diameter: 42 to 63 mm.; thickness: 8 to 22 mm.

Material: Translucent, dark gray flint (2), tan and gray chert (10).

Distribution: Zone I (8), mixed Zones I and II (2), Zone II (1), Zone III (1).

FORM B (Fig. 40, I) Long End and Side Scrapers

Number of specimens: 2

Form: These artifacts are made from long, narrow flakes. A

thick bulb of percussion forms the base of the scraper at one end. One face is a smooth flake scar; the reverse face is comprised of three parallel flake scars running almost the entire length of the scraper. Numerous small pressure flake scars are present along the sides and around the bit end. In effect, the flake is trapezoidal in cross section. The long edges are roughly straight and essentially parallel.

Dimensions: Length of complete specimen: 137 mm.; width: 30 and 35 mm.; thickness: average about 12 mm.

Material: Mottled gray chert.

Distribution: Mixed Zone I and II (1), mixed Zones II and III (1).

FORM C (Fig. 40, E, F)

Large Side Scrapers

Number of specimens: 20

Form: All specimens of this type are made from large, thin flakes. The unaltered removal flake scar forms one face of each artifact; the other face shows one large flake scar and numerous smaller ones. All have one long, finely flaked scraping edge, which is usually straight, but is slightly convex in three specimens. Overall outline varies considerably but the scraping edges are very similarly formed on all specimens. Six specimens show small traces of cortex from the original nodule.

Dimensions: Long axis: 52 to 78 mm.; short axis: 29 to 48 mm.; length of scraping edge: 33 to 74 mm.; thickness: 5 to 13 mm.

Material: Dark brown flint (1), dark gray flint (1), and varying shades of tan and gray chert (18).

Distribution: Zone I (3), mixed Zone I and II (2), Zone II (1), mixed Zones II and III (4), Zone III (5), and provenience uncertain (5).

FORM D (Fig. 40, G, H)

Long Cortex Scrapers

Number of specimens: 15

Form: These artifacts are all made from long, thick cortex flakes (Epstein, 1960a: 37). A series of small pressure flakes

Table 6.
Distribution of Scrapers by Zone.

Type	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Provenience uncertain	Totals
Scraper A	8	2	1	..	1	..	12
Scraper B	..	1	..	1	..	..	2
Scraper C	3	2	1	4	5	5	20
Scraper D	..	..	4	..	11	..	15
Scraper E	2	3	3	7	21	1	37
Scraper F	..	5	4	3	5	2	19
Scraper G	..	1	3	3	1	2	10
Scraper H	2	8	6	5	7	..	28
Scraper I	..	..	..	1	2	..	3
Scraper J	..	..	..	..	1	..	1
Misc. & Fragmentary	19	24	65	31	57	43	239
TOTALS	34	46	87	55	111	53	386

have been removed along one of the long flake edges producing a fine scraping edge. Paralleling this scraping edge the other flake edge is unaltered and bordered by a long band of cortex from the surface of the original source nodule. In cross section the specimens are roughly wedge-shaped with the point of the wedge representing the scraping bit while the base of the wedge represents the thick cortex-bordered edge. These artifacts form a distinctive type of unifacially flaked tool.

Dimensions: Long axis of flake: 50 to 75 mm.; short axis: 26 to 50 mm.; thickness along cortex edges: 9 to 16 mm.; length of scraping edge: 22 to 37 mm.

Material: Dark brownish-gray flint (5), gray chert (10).

Distribution: Zone II (4), Zone III (11).

Remarks: Scrapers of this type from Trans-Pecos Texas have been described by Epstein (1960a: 73). The Oblate specimens conform generally to those recorded by Epstein, but are somewhat more uniform in size and shape.

FORM E (Fig. 40, C, D)

Small Flake Scrapers

Number of specimens: 37

Form: These scrapers consist of small, thin flakes with a very fine, pressure flaked, scraping bit along one edge. Five specimens have small remnants of the cortex from source materials.

Dimensions: Long axis of flake: 21 to 60 mm.; short axis: 10 to 33 mm.; maximum thickness: average 5 mm.; length of scraping edge: 15 to 34 mm.

Material: Gray to medium-brown chert, ranging in texture from fine to medium-grained (28), and brownish translucent flint (9).

Distribution: Zone I (2), mixed Zones I and II (3), Zone II (3), mixed Zones II and III (7), Zone III (21), provenience uncertain (1).

FORM F (Fig. 40, J, K)

Small, Concave-edge Scrapers

Number of specimens: 19

Form: All of these specimens are made from irregularly shaped flakes. The flakes vary considerably in size and shape, the only typical feature being the small concave scraping bit. The scraping edges apparently were formed by the removal of a series of small pressure flakes from the flat face of a plano-convex flake.

Dimensions: Length of the long flake axis: 30 to 107 mm.; length along short axis: 17 to 52 mm.; thickness: 6 to 23 mm.; width across the scraping concavity: 6 to 23 mm.; depth of concavity: 3 to 9 mm.

Material: Dark red flint (1), dark brown flint (4), and gray to light brown chert (14).

Distribution: Mixed Zones I and II (5), Zone II (4), mixed Zones II and III (3), Zone III (5), uncertain (2).

FORM G (Fig. 40, O, P)

Large, Concave-edge Scrapers

Number of specimens: 10

Form: Large thick flakes of various shapes and sizes were used



FIGURE 40. Scrapers. A, B, Form A. C, D, Form E. E, F, Form C. G, H, Form D. I, Form B. J, K, Form F. L, M, Form I. N, Form J. O, P, Form G.

in the manufacture of these artifacts. On each flake one face had multiple flake scars while the opposite face is comprised of one large removal flake scar and a positive bulb of percussion. A rather long concave scraping edge was formed on each flake by the removal of numerous small flakes, using the flatter face as a striking platform. Five specimens have traces of patina adhering to small sections of the uneven convex face; one is made from an initial cortex flake (Epstein, 1960a: 37) struck from a chert cobble.

Dimensions: Length along long flake axis: 45 to 138 mm.; width: 38 to 60 mm.; thickness: 13 to 26 mm.; length of concave scraping edge: 28 to 61 mm.; depth of the concavity in the edge: 3 to 9 mm.

Material: Two specimens are made of dark brown flint with small patches of white patina remaining; the others are made from the local gray-tan chert.

Distribution: Mixed Zones I and II (1), Zone II (3), mixed Zones II and III (3), Zone III (1), provenience uncertain (2).

FORM H

Large, Crude Scrapers

Number of specimens: 28

Form: These artifacts vary greatly in size and outline. Some are made from large, thick flakes and others from small cores. Each specimen has a unifacially formed scraping edge. Five are made from initial cortex flakes, and 23 show slight traces of cortex from the original nodules.

Dimensions: Length: 44 to 107 mm.; width: 25 to 65 mm.; thickness: 10 to 25 mm.; length of scraping edge: 20 to 50 mm.

Material: Three are made of brownish-gray flint, and all others are made of gray to brown chert.

Distribution: Zone I (2), mixed Zones I and II (8), Zone II (6), mixed Zones II and III (5), Zone III (7).

FORM I (Fig. 40, L, M)

Small End Scrapers

Number of specimens: 3

Form: These end scrapers are plano-convex in cross section. Each specimen is made from a thin flake with the removal flake scar forming the plane face. A large bulb of percussion and a prepared striking platform appear at the base of each specimen; the opposite end of the flake has been unifacially flaked into a smoothly convex scraping bit with a steeply beveled edge.

Dimensions: Length: 30 to 56 mm.; width at scraping bit: 26 to 40 mm.; maximum thickness (at base): 8 to 12 mm.; bit thickness: 6 to 9 mm.

Material: Gray chert (1), dark brown flint (2). The two flint specimens are made of a very fine quality flint which is highly translucent.

Distribution: Mixed Zones II and III (1), Zone III (2).

FORM J (Fig. 40, N)

Small Triangular Scraper

Number of specimens: 1

Form: Fashioned from a markedly plano-convex flake, this end

scraper is distinguished from the above (Form I) by its small size and neat, triangular outline. In size it approaches so-called thumbnail scrapers. Flake scars appear along all margins, and to some extent, across both faces. The moderately steep scraping bit is essentially straight.

Dimensions: Length: 25 mm.; width at scraping bit: 15 mm.; bit thickness: 6 mm.

Material: Gray chert, with positions of the surface patina appearing on both flat surfaces.

Distribution: Zone III.

Miscellaneous Scraper Fragments

A total of 239 miscellaneous and fragmentary scrapers were recovered from the Oblate Site excavation. By and large this group consists of various size flakes with small unifacially flaked scraping bits along one or more edges.

In most specimens the bit of the scraper has been partially broken away. These scrapers range from thumbnail size chips to nearly fist-size flakes. The distribution of these specimens is rather uniform throughout the deposit: Zone I (19), mixed Zones I and II (24), Zone II (65), mixed Zones II and III (31), Zone III (57), uncertain provenience (43). Ninety-one scrapers are made from cortex flakes and eight from initial cortex flakes; 140 specimens show no traces of cortex. Eighty-two of these fragments are made of brown to reddish flint of varying degrees of translucency. The other 157 all are made of tan to medium-gray chert. Small circular craters or "potlids," an indication of burning, mark the surface of 53 fragments.

Miscellaneous Lithic Artifacts

GRAVERS (Fig. 41, H, I)

Number of specimens: 6

Form: These specimens are made from rather thick plano-convex flakes. A prominent, sharp, beak has been formed on one edge of each flake. Numerous small flakes were removed, using the flat flake surface as a striking platform, to form two concavities in the edge which come together to form the beak of the graver. The graver beaks show microscopic evidence—smoothed tips—of rather intensive use.

Dimensions: Diameter of the flakes: 35 to 59 mm.; length of graver bit: 3 to 9 mm.; width of bit at base: 4 to 15 mm.; flake thickness: 8 to 16 mm.

Material: Chert, light mottled gray to dark brown in color.

Distribution: Zone II (1), mixed Zones II and III (1), Zone III (2), provenience uncertain (2).

ADZ (Fig. 41, M)

One distinctive flint artifact, found in a disturbed level of the excavation is a long narrow tool made from a thick plano-convex flake. One face is composed of an almost flat flake scar; the other face is in the form of an arched-back ridge sloping into a slightly convex bit at each end

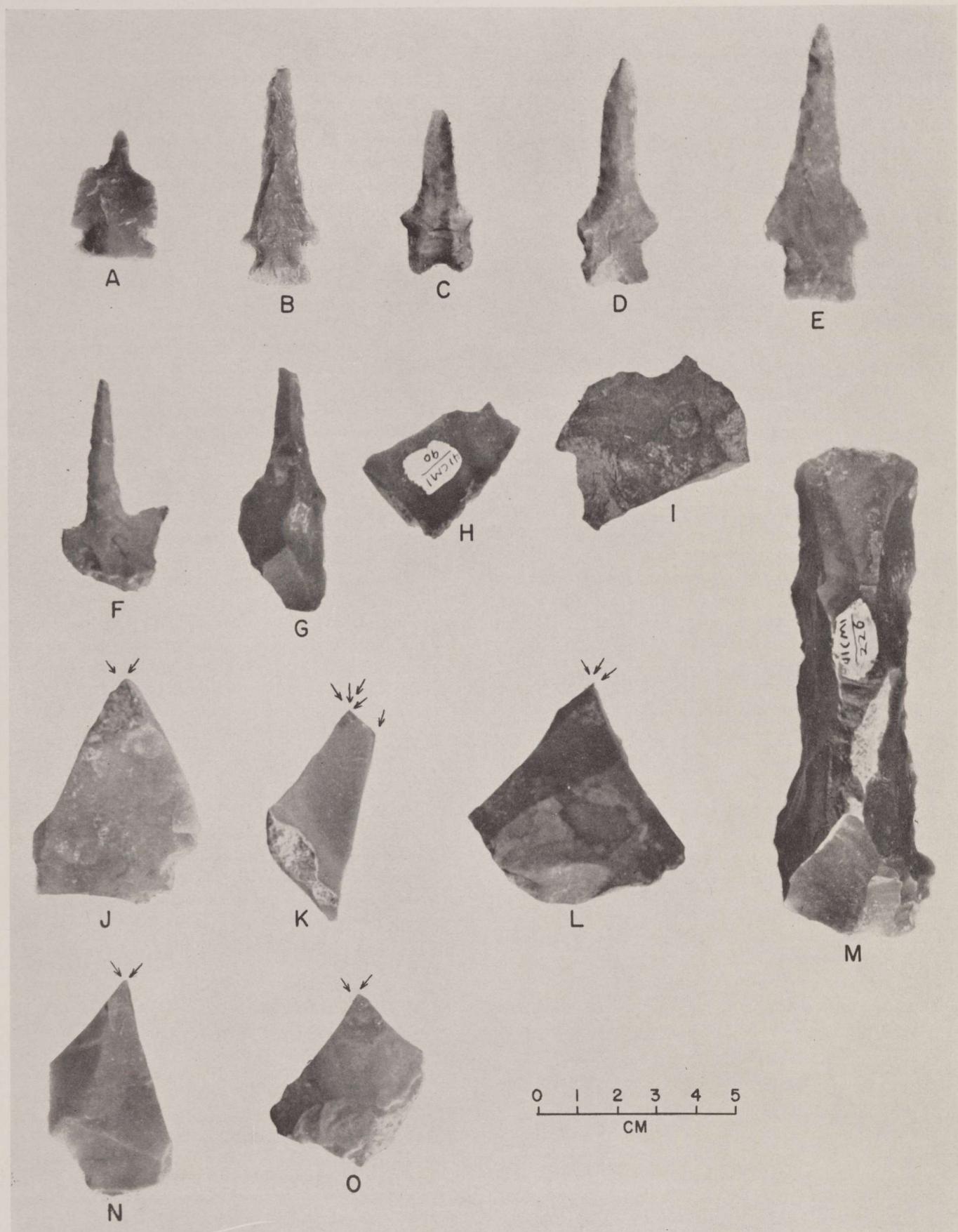


FIGURE 41. Drills, Gravers, Burins, and Adz. A-E, Reworked dart point drills. F, G, Flake drills. H, I, Gravers. J-L, N, O, Burins. M, Adz.

of the flake. All edges show signs of shaping. The cutting edges at both ends show evidence of intense use in the form of small precussion flake scars on both faces which have left the bit edges with a smooth appearance. This seems to be the type of wear which might result if the instrument were used as an adz. The total length is 124 mm.; width of bits 31 and 35 mm.; width at center 28 mm.; thickness at center of arched back 31 mm.; thickness of bits about 2 mm. This implement is very similar to a "Guadalupe adz" (Campbell, personal communication), except that the angle between the two faces at the bit end is more acute on the Oblate specimen.

BURINS (Fig. 41, J-L, N, O)

The Oblate Site excavation yielded six burins and one burin spall. These implements, gleaned from an examination of a large quantity of lithic detritus, have been examined by J. F. Epstein* and he has kindly furnished the following descriptions and comments:

Specimen No. 1: This is a burin made from a broken indeterminate flake. One corner of the break surface has been used as a striking platform to remove a burin spall. The resulting bit shows some use-flake scars.

Specimen No. 2: This is a burin made from a narrow core. One

short burin spall, which broke in a hinge fracture, has been taken off one end of the piece. The platform for the burin seems to have been a flake facet on the core. This specimen may have been used as a hand-held plane with the striking platform being held against the wood or bone to be planed.

Specimen No. 3: This is a burin made from an indeterminate flake fragment. One corner of the break surface was used as a striking platform for removing a burin spall that went clear down the edge of the artifact (it did not break off in a hinge fracture). This specimen may have been used in a manner similar to specimen No. 2.

Specimen No. 4: This appears to be a burin *bec de flute* broken near the tip. An attempt has been made to resharpen it using one corner of the break surface as a striking platform. This corner shows battering marks which may represent an unsuccessful attempt to remove fine burin spalls.

Specimen No. 5: This burin is made from a large, thick, indeterminate flake fragment. The break surface was used as a striking platform for removing two burin spalls. One spall went clear down the edge without breaking off in a hinge fracture; the other spall was smaller and broke off at a slight angle to the first.

Specimen No. 6: This artifact resembles a *bec de flute*, but I do not know exactly how it was formed. It was certainly used as a burin and the corner shows use-flake facets. There may be a slight negative bulb of percussion on one face near this corner.

Specimen No. 7: This is a secondary burin spall (the kind produced in resharpening a burin rather than in originally making a burin). It seems to have come from a specimen similar to specimen No. 5. It does not show use. This spall broke off in a slight hinge fracture and the reverse side shows that the spall removed before this one had also broken off in a slight hinge fracture. This spall shows a very deep negative bulb of percussion on one face.

Material: These specimens are all made from locally occurring flint and chert.

Dimensions: Length (from the bit to the opposite edge of the flake): 43 to 55 mm.; thickness at the bit: 4 to 10 mm.

Distribution: Zone I (no. 7), mixed Zones I and II (no. 4), Zone II (nos. 1, 2, 3, and 6), uncertain (no. 5).

REWORKED DART POINT DRILLS (Fig. 41, A-E)

Number of specimens: 6

Form: Six dart points have been resharpened into drills with long narrow bits. All of these specimens are unbroken. One drill is made from an *Ensor*, Variety A point; two are made from dart points with slight barbs, expanding stems and straight or slightly concave bases; two are made from dart points with slight to distinct shoulders, rectangular stems, and straight bases; the other drill is made from what seems to have been a *Pedernales*, Variety C point. In cross section the bits of these drills range from circular near the tip to oval near the shoulders. All of the bits have smoothly worn edges indicating some amount of use.

Dimensions: Length: 39 to 68 mm.; maximum width (at shoul-

Type	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Provenience uncertain	Totals
Adz	--	--	--	--	--	1	1
Bifacially flaked tips	16	17	21	16	49	29	148
Burins & spalls	1	1	4	--	--	1	7
Drills, reworked							
dart points	1	2	1	--	2	--	6
Drills, flake	--	1	3	--	2	1	7
Gravers	--	--	1	1	2	2	6
Gunflints	--	--	--	1	6	--	7
Milling stones	4	19	11	9	15	3	61
Milling slabs	--	2	1	2	1	1	7
Bedrock grinders	--	--	--	--	--	--	2
Hammerstones	--	4	1	3	--	7	15
Scored stones	--	1	3	2	--	--	6
Pigment stones	1	9	--	1	4	--	15
Crystalline Quartz	13	11	1	1	1	1	28
Calcite	--	1	--	--	2	--	3
Obsidian	--	1	--	--	--	--	1
TOTALS	36	68	47	37	84	46	320

* Dr. Epstein has recognized and described burins from several sites in western Texas, (Epstein, 1960a: 33-36; 1960b: 93-97).

ders): 20 to 25 mm.; thickness: 6 to 9 mm.; bit length: 14 to 40 mm.; bit width (at midpoint): 6 to 12 mm.

Material: Dark brown translucent flint (2), tan and gray chert (4).

Distribution: Zone I (1), mixed Zones I and II (2), Zone II (1), Zone III (2).

FLAKE DRILLS (Fig. 41, F, G)

Number of specimens: 7

Form: Only one specimen is complete, three have tips missing, and one is a small shaft fragment. Each specimen was made from a medium-sized, irregularly shaped flake. The long narrow shafts were formed by bifacial flaking. Shaft edges are straight or slightly convex and shoulders (where the shaft joins the flake) range from prominent and angular to very poorly defined.

Dimensions: Average total length (estimated): 65 mm.; average width of shaft near the tip: 4 mm.; shaft width near the shoulders: 8 to 16 mm.; average shaft length: 45 mm.; thickness: 6 to 9 mm.

Material: Dark brown flint (3) and chert (4).

Distribution: Mixed Zones I and II (1), Zone II (3), Zone III (2), uncertain (1).

GUNFLINTS (Fig. 44, A, B)

Seven lithic artifacts are identified as gunflints. Two specimens of very fine grained, dark gray-green flint, are gunflints of European (probably English) manufacture (Elaine Bluhm, personal communication). The other five specimens are more crudely shaped from tan and gray flint, but are similar in size and shape to the previously mentioned specimens. All of these artifacts are thin, rectanguloid, have steeply beveled edges, and tend to be plano-convex in cross section. The finer specimens are 21 and 25 mm. long, 15 and 19 mm. wide, and 5 and 6 mm. thick. The dimensions of the 5 crude specimens are: length 20 to 27 mm.; width 16 to 23 mm.; thickness 5 to 8 mm. One of the coarse specimens was found in mixed Zones II and III, and the other six gunflints occurred in Zone III.

HAND MILLING, AND POLISHING STONES

(Fig. 42, A, B)

Number of specimens: 61

Form: Seven specimens are oval in outline and relatively thick in cross section. These seem to have been shaped into oval handstones by pecking and grinding. The other 54 artifacts are small to medium-sized river cobbles of various shapes which show no signs of alteration other than light polishing on one or more faces.

Dimensions: Shaped specimens—length: 112 to 132 mm.; width: 85 to 92 mm.; thickness: 27 to 58 mm.; unshaped cobbles—length: 70 to 127 mm.; width: 60 to 111 mm.; thickness: 22 to 68 mm.

Material: Many varieties of rock aggregates were utilized. Those recognized include quartzite, sandstone, hematite, chert, and limestone.

Distribution: Zone I (4), mixed Zones II and I (19), Zone II (11), mixed Zones II and III (9), Zone III (15), uncertain provenience (3).

MILLING SLABS

Number of specimens: 7 fragments

Form: These relatively thin limestone slab fragments are ground smooth on one face. The smoothed grinding surfaces are very slightly concave and show no evidence of pecking.

Dimensions: Maximum diameter of fragments: 58 to 275 mm.; thickness: 15 to 57 mm.

Material: Limestone.

Distribution: Zones I and II (2), Zone II (1), mixed Zones II and III (2), Zone III (1), surface deposit (1).

Remarks: Milling slabs are thinner toward the center because of the concave grinding face, and the thinner fragments described above seem to represent the central sections of well-worn slabs.

BEDROCK MILLING SLABS

Two shallow, basin-shaped milling depressions were discovered in the limestone bedrock beneath the shelter deposit. They were in the surface of the uppermost ledge below the deposit. The first, centered at N227.8—W95.8, measured 0.8 feet along the north-south axis and 1.2 feet along the east-west axis. The other, centered at N240.9—W94.0, measured 0.9 feet along the north-south axis by 0.6 feet along the east-west axis. The maximum depth of each is between 10 and 20 mm. at the center. Approximately 2.5 feet of deposit lay above each milling slab. Therefore, both were formed either during the accumulation of Zone I or during the accumulation of lower Zone II.

GROOVED LIMESTONE OBJECT (Fig. 43, K)

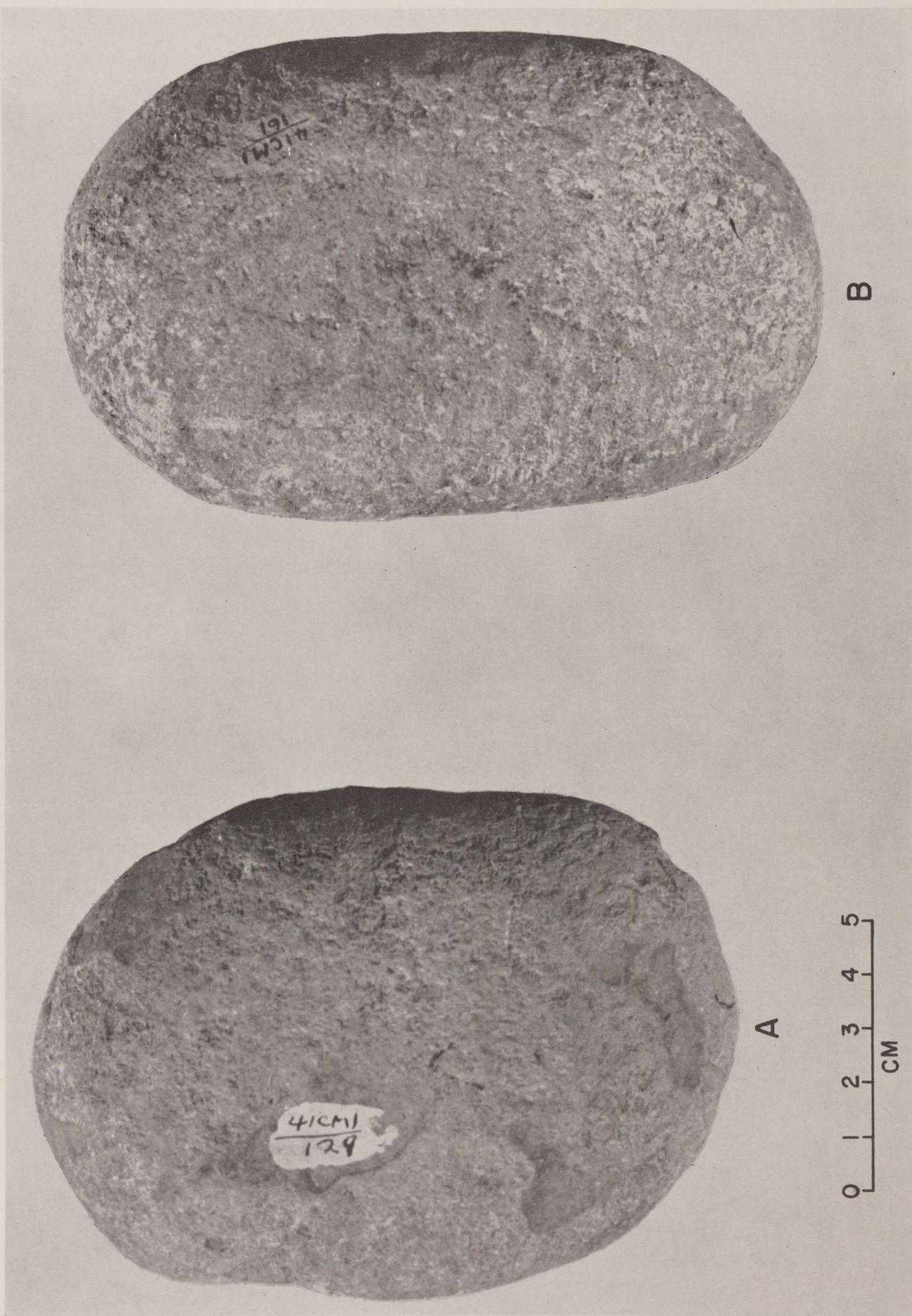
One smooth spall of fine-grained limestone has a deep irregular groove around one end. The outline of this specimen is roughly triangular with one pointed end, fairly straight edges, and a slightly convex base. The groove encircles the artifact about 1 cm. above the base. The specimen is lenticular in cross section. Dimensions: length 95 mm.; width at base 28 mm.; thickness 10 mm. This specimen was found in Zone I. Its use is unknown.

HAMMERSTONES

Number of specimens: 15

Form: All of these specimens are made from smooth river pebbles of various shapes and sizes. Each pebble has been battered along one or more edges and was perhaps used in the preparation of chipped stone tools. One specimen is strikingly

FIGURE 42. Hand Milling Stones.



large in size and shows severe battering scars along several edges; all other specimens are about fist-size.

Dimensions: Diameter: 58 to 85 mm.; thickness: 22 to 50 mm.; the extra large specimen is 205 mm. long, 118 mm. wide, and 84 mm. thick.

Material: One specimen is made of limonite, 3 of quartzite, 10 of various grades of limestone, and the large specimen is of tan chert.

Distribution: Mixed Zones I and II (4), Zone II (1), mixed Zones II and III (3), provenience uncertain (7).

SCORED STONES

Number of specimens: 6

Form: Three specimens are smooth river pebbles which have small irregular lines scratched into their surfaces but show no further signs of alteration or use. A heavily patinated flint flake has several fine grooves cut into the patina. The two remaining specimens are smooth pieces of gray limestone with numerous striations on the surface. No pattern or design can be detected in the scratches of any of the specimens.

Dimensions: The smooth pebbles range from 35 to 66 mm. in diameter, the flint flake is 45 mm. wide and 4 mm. thick, and the pieces of limestone are 68 and 112 mm. long by 26 and 61 mm. thick.

Material: One hard red siltstone pebble, 2 gray quartzite pebbles, 1 brown flint flake, and 2 pieces of gray limestone.

Distribution: Mixed Zones I and II (1), Zone II (3), mixed Zones II and III (2).

RED PIGMENT STONES (Fig. 44, E, F)

Fifteen fragments of hematite, ranging in quality from fine-grained ochre to coarse sandy lumps, offer an excellent source for red pigment. Most specimens are unaltered, but several have deep scratches and artificially smoothed facets which indicate they were utilized by the aboriginal occupants of the shelter. The maximum diameter of the stones ranges from 10 to 50 mm. Distribution: Zone I (1), mixed Zones I and II (9), mixed Zones II and III (1), Zone III (4). This does not necessarily represent the entire sample of this material from the excavation; many coarse-grained fragments may have been mistaken for unaltered stones and discarded at the screens. The source of this material has not been determined.

Ceramics (Fig. 44, C, D)

The 194 potsherds from the Oblate Rockshelter were recovered from the upper one foot of the deposits in the test area in front of the overhang (Fig. 30), specifically from Zone III (184) and heavily disturbed levels (10). The majority (173), however, occurred within the top six inches of Zone III. The sherds seem to represent only one or two vessels and their rather restricted vertical and

horizontal distribution supports this hypothesis.

The sherds are plain with well-smoothed exterior and interior surfaces. All traces of coil bands and tool marks have been obliterated by polishing. All specimens are impregnated with fine bone temper, and, in lesser quantity, angular clay fragments. The sherd faces representing the exterior vessel surface range in color from black to medium gray. Interior surfaces are more mottled in appearance, varying from medium gray to light orange-brown in color.

Four of the 11 rim sherds were fitted together in the laboratory to form a large vessel fragment. In cross section the rim sherds show a lip which is rounded and slightly thinner than the vessel walls. A mechanical extension of the available rim curvature produces a vessel diameter, at the rim, of between 25 and 30 cm.

The individual sherds range in size from 10 to 55 mm., with most specimens falling nearer the smaller measurement. Ten sherds have been fitted together to form a fragment, some 10 cm. in diameter, from the body area of a vessel. Sherd thickness is amazingly uniform at 7 mm.; there is less than 1 mm. variation except at the lip which averages 4 mm. thick.

No basal fragments of vessels, recognizable as such, were found. The reconstructed rim and body fragments indicate a plain, polished, rather deep jar with a straight, plain rim and thin rounded lip.

The ceramics from the Oblate Site are similar to *Leon Plain* pottery (Suhm *et al.*, 1954: 386, Pl. 74, K) which is occasionally found in Central Texas Aspect sites.

Worked Bone and Antler

BONE AND ANTLER IMPLEMENTS

(Fig. 43, L-Q)

Eleven tips of bone and antler tools, showing signs of use, were found in the deposits. Seven are fragments of deer antler and the other four are polished slivers of unclassified animal bone. The tip of each specimen is blunted from use and striations radiate back along the shaft. All specimens are fragmentary and the determinable dimensions are of little significance. The largest fragment is 50 mm. in length and the smallest is 18 mm. Distribution: Zone I (3), mixed Zones I and II (1), Zone II (2), Zone III (4), provenience uncertain (1).

In addition to the above, there are five cut and grooved bone fragments. The only identifiable piece is a deer metapodial. Two small, unidentifiable fragments have been smoothly cut through along one straight edge; three have multiple, parallel grooves in one face. Maximum diameter ranges from 22 to 80 mm. Distribution: engraved deer bone in mixed Zone I and II, Zone II (1), mixed Zones II and III (1), Zone III (1), uncertain (1).

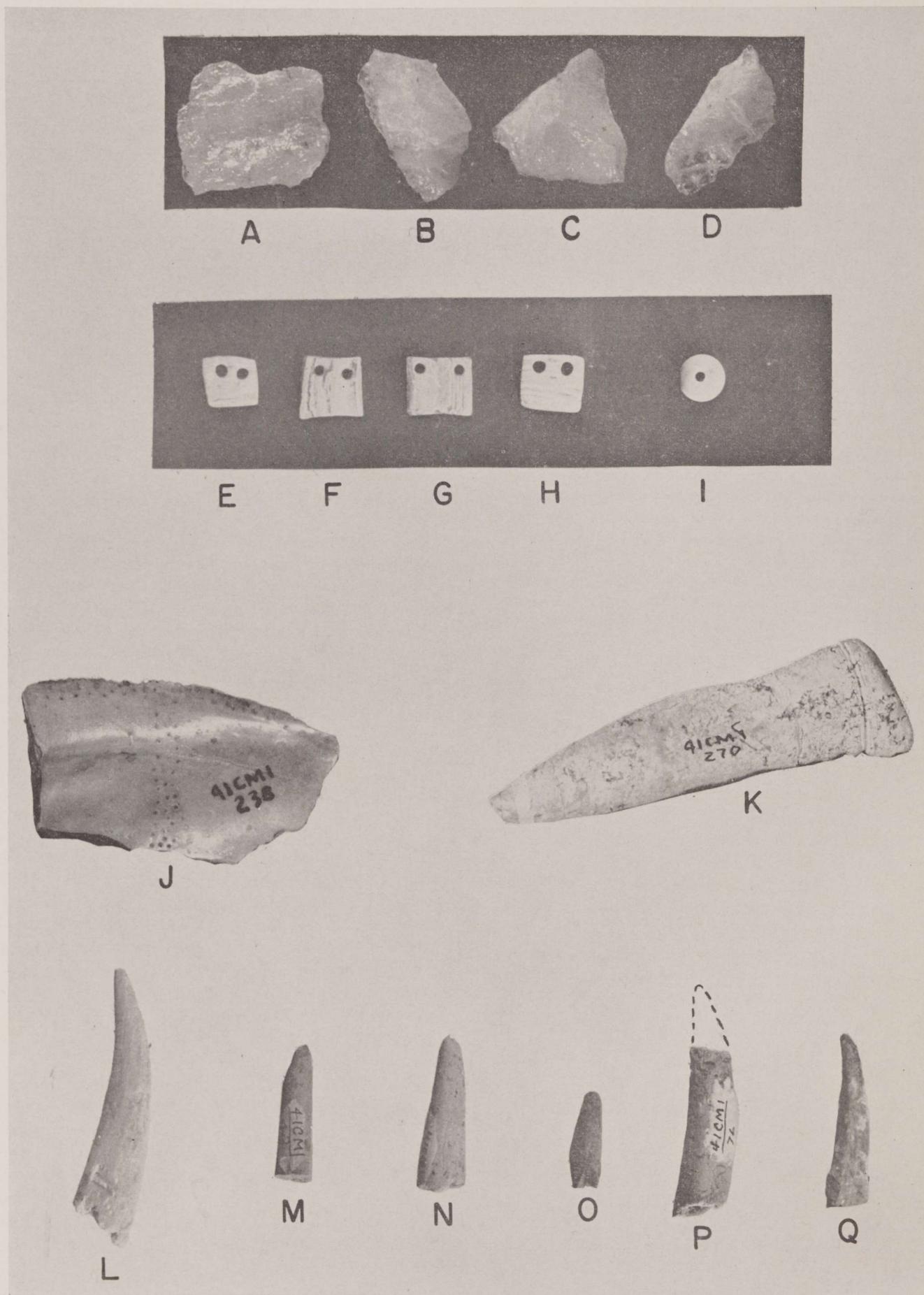


FIGURE 43. Quariz Fragments, Glass Bead, Worked Stone, Shell, and Antler. A-D, Crystalline quartz fragments. E-H, Mussel shell pendants. I, Glass bead. J, Worked mussel shell. K, Grooved stone object. L-Q, Deer antler tools. All specimens natural size.

TORTOISE SHELL WITH PIGMENT

One small fragment of tortoise carapace, 23 mm. in diameter, was found in a disturbed level of the deposit. One surface of this fragment is heavily coated with fine red pigment. The specimen may represent a painted ornament of some sort or else a sherd from a tortoise shell vessel used to store the pigment.

BONE BEADS

Number of specimens: 2

Form: One fragmentary specimen is made of a thin, highly polished, sliver of bone. It is ovoid in outline with the edge of a perforation appearing on the broken edge of the piece. The hole was biconically drilled. One face is white and the other is stained red with pigment. The second specimen is a small tubular bone fragment, unpolished, which shows signs of having been removed from the central area of a small bone by being smoothly cut around both ends. A deep groove encircles the bead near each end.

Dimensions: The flat specimen is 10 mm. wide at the fractured end, 3 mm. thick, and the perforation is 4 mm. in diameter. The tubular specimen is 24 mm. long and 6 mm. in diameter.

Material: Bone of undetermined species.

Distribution: The tubular bead was found in mixed Zones I and II; the flat specimen was in Zone III.

Mussel Shell Artifacts

DECORATED MUSSEL SHELL OBJECT (Fig. 43, J)

One large mussel shell fragment, from Zone II, has been carefully decorated with punctations and notches. The specimen is roughly rectanguloid in outline. One long edge has small V-shaped notches cut into the shell at about

Table 8.
Distribution of Non-lithic Artifacts by Zone.

Item	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Provenience uncertain	Totals		
							184	10	194
Ceramics	--	--	--	--	184	10	194		
Worked bone tools	3	2	3	1	5	2	16		
Tortoise shell/pigment	--	--	--	--	--	1	1		
Bone beads	--	1	--	--	1	--	2		
Mussel shell pendants	--	--	--	2	2	1	5		
Decorated mussel shell	--	--	1	--	--	--	1		
Scored mussel shell	1	--	--	1	3	--	5		
Perforated mussel valves	1	1	7	1	--	4	14		
Stained mussel shell	--	--	--	1	--	--	1		
Glass bead	--	--	--	--	1	--	1		
Metal gun parts	--	--	--	1	1	--	2		
TOTALS	5	4	11	7	197	18	242		

2 mm. intervals. Paralleling these notches near the same long edge is a double row (irregularly spaced) of tiny punctations less than 1 mm. in diameter and spaced roughly at 2 mm. intervals. An irregularly spaced triple row of punctations crosses the center of the artifact along the short axis (perpendicular to the long decorated edge). About 88 punctations make the T-shaped design. There are 26 notches on the long edge; several others seem to have been broken away. The reverse side of the artifact (representing the exterior surface of the mussel valve) is unaltered. Dimensions: length: 71 mm., width: 34 mm., thickness averages: 8 mm.

MUSSEL SHELL PENDANTS (Fig. 43, E-H)

Number of specimens: 5

Form: These small cut fragments of mussel shell are approximately square in outline and very thin. The edges are straight to slightly convex and well smoothed. Near one edge of each specimen are two small bifacially drilled holes.

Dimensions: Width: 10 to 12 mm.; thickness averages: 1 mm.; average diameter of perforations: 2 mm.; distance between perforations ranges from 2 to 5 mm.

Material: Unpolished mussel shell.

Distribution: Mixed Zones II and III (2), Zone III (2), uncertain (1).

Remarks: Although the edges of some specimens are smoothed, the bevel remaining on several edges indicates that these artifacts were cut from a mussel valve by deeply engraving the exterior surface only.

SCORED MUSSEL SHELL FRAGMENTS

Five small fragments of scored mussel shell were found —one in Zone I, one in mixed Zones II and III, and three in Zone III. All are irregularly shaped but each specimen has one or two smoothly cut edges and several fine parallel grooves on one or both faces. Maximum width ranges from 15 to 25 mm. Thickness averages 1 mm. These fragments are probably by-products resulting from the manufacture of shell ornaments such as the pendants described above.

PERFORATED MUSSEL VALVES

Fourteen mussel shells have smoothly drilled holes approximately in the center of the valves. These holes all seem to have been drilled from the inside surface of the valve outward. The perforations average 3 mm. in diameter. The shells show no further signs of alteration.

Distribution: Zone I (1), mixed Zones I and II (1), Zone II (7), mixed Zones II and III (1), provenience uncertain (4).

STAINED MUSSEL SHELL

One mussel valve is rather heavily stained with red

pigment on both the internal and external surfaces. No designs can be detected. It was found in Mixed Zones II and III.

Glass

GLASS TRADE BEADS (Fig. 43, I)

One glass bead was found in Zone III. It is opaque white in color, and appears to have a thick coat of surface patina. It is round with flat ends and has a very small suspension hole, of uniform diameter, situated centrally. Size is 9 mm. in diameter and 9 mm. long; the hole is slightly less than 1 mm. in diameter. This is one of the common forms of Indian trade beads found at sites in Texas.

MODERN GLASS

Several fragments of wine bottles, fruit jars, and soft drink bottles were found on and just beneath the surface of the deposits. All of these specimens appear to date from the 20th century.

Metal (Fig. 44, G, H)

Several dozen miscellaneous metal objects were found at or near the surface of the shelter deposits; all are either heavily rusted or covered with corrosion. These specimens are identified as follows: two bottle caps, tin can scraps, common nails, one square nail, one thirty-caliber cartridge case, one twenty-two caliber cartridge case, one can opener, and small unidentified fragments. All of these specimens came from the uppermost part of Zone III and are apparently of the 20th century origin.

In addition to the above metal fragments, one ornamental brass plate (Fig. 44, G) was found in Zone III and a trigger (Fig. 44, H) was found in mixed Zones II and III. These gun parts—in connection with the gun-flints (p. 109) and the glass bead (p. 114) described previously—probably represent a brief historic Indian occupation of the shelter. There is evidence that Tonkawa and possibly Jumano Indians frequented this part of the Guadalupe drainage in early contact times (Kelley, 1947c: 46; Newcomb, 1961: 133). These groups may have lost the trade items mentioned above as well as some of the other artifacts found in Zone III. Evidence for a connection between the historic artifacts and specific Indian-made artifacts from Zone III is very tenuous, however.

MISCELLANEOUS CULTURAL DEBRIS

Vertebrate Faunal Remains

A small number of animal bones was found in each stratigraphic zone within the deposits. Zone III produced the largest sample, and the bones from this zone are well preserved. The lower zones produced smaller samples of poorly preserved bones.

With the exception of bison all of the species represented by the faunal sample are found in the area today. Bone identifications were accomplished by detailed comparisons of individual specimens with collections in the Laboratory of Vertebrate Paleontology, The University of Texas. Table 9 shows the distribution, by zone, of the faunal remains from the 1959 season. Vertebrate remains recovered during the 1960 season have not been classified.

Invertebrate Faunal Remains

Invertebrate remains—the calcareous shells of mussels and snails—comprise the bulk of the faunal remains from the Oblate Site. Mussel and snail shells occurred throughout the deposits and were so abundant in some areas that they formed an appreciable percentage of the bulk of the deposits. Large samples of these shells were collected from

Table 9.
Distribution of Vertebrate Remains by
Zone (1959 season only).

Genera	Zone I	Zone I-II	Zone II	Zone II-III	Zone III	Pro- venience uncertain	Totals
Bison (Buffalo)	2	..	..	..	7	1	10
Canis (dog, wolf, coyote)	..	1	..	..	1	..	2
Castor (beaver)	..	1	..	..	1	..	2
Mephitis (skunk)	..	1	..	..	4	1	6
Neotoma (rodent)	..	..	..	1	1	..	2
Odocoileus (deer)	22	32	23	3	12	19	111
Sigmodon (rodent)	..	..	..	..	1	..	1
Sylvilagus (rabbit)	..	1	..	..	..	..	1
Terrapene (terrapin)	7	20	20	11	9	12	79
Trionyx (soft-shell turtle)	2	3	5	..	..	..	10
Urocyon (fox)	..	..	2	..	3	1	6
Bird	..	..	1	1	1	1	4
Fish	..	12	22	5	34	10	83
Snake	..	1	3	..	3	16	23
Unidentified fragments	..	..	..	..	..	..	88
TOTALS	33	71	77	21	77	61	428

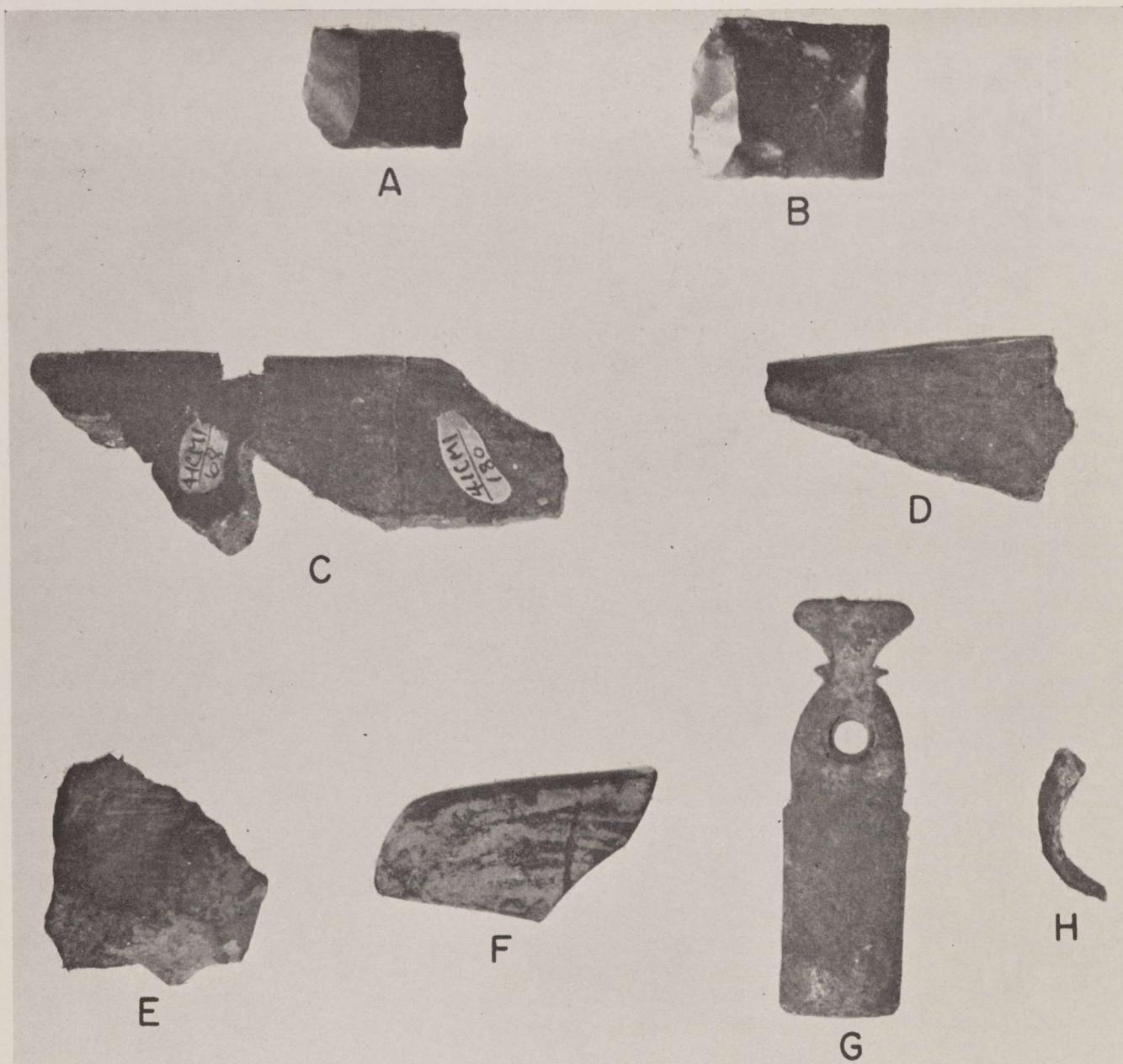


FIGURE 44. Gunflints, Potsherds, Pigment, and Metal Objects. A, B, Gunflints. C, D, Ceramic rimsherds. E, F, Pigment. G, H, Metal gun parts. A and B one-quarter larger than actual size; remainder natural size.

all zones and various excavation units; some of these will be used for radiocarbon dating and others for species identification.

Crystalline Minerals

Obsidian

One small flake of volcanic glass, about 1 cm. in diameter, was found in mixed Zones I and II. It is black and translucent. The nearest sources of this material are in the Republic of Mexico or in the state of New Mexico;

both areas are many hundreds of miles distant from the Oblate Site.

Calcite

Three fragments of crystalline calcite were recovered from the excavation: one from mixed Zones II and III and the other two from Zone III. Two are amber in color and the other is dark gray. All three specimens are approximately 3 cm. in diameter. Calcite geodes occur sporadically in the local limestone formations, but none was observed near the Oblate Rockshelter.

Quartz (Fig. 43, A-D)

In addition to the worked tool-tip mentioned previously, 28 small fragments of crystalline quartz were recovered. These flakes range in size from 10 to 34 mm. in diameter. The thicker fragments are white and translucent while the thin chips are transparent. None of the chips is streamworm or altered in any noticeable way. The vertical distribution of these fragments is predominately with the lower levels: Zone I (13), mixed Zones I and

II (11), Zone II (1), mixed Zones II and III (1), Zone III (1), uncertain (1).

Miscellaneous Perishable Material

Within the top half-foot level of the deposit various perishable objects were found. These include pecan shells, fragments of a gourd shell, insect carapaces, and bits of animal feces. All of this minutiae is considered to be of modern origin.

SUMMARY

The following general statements are based upon the typological characteristics and provenience of the various artifact categories from the Oblate Site: (single specimens are not included as traits)

1. Zone I at the Oblate Rockshelter contained cultural material representing a component of the Edwards Plateau Aspect. Primary traits (those occurring principally in Zone I) include: *Bulverde*, *Castroville*, *Marcos*, *Marshall*, and *Pedernales* dart points; scraper Form A; deer bones; crystalline quartz fragments. Other traits (either very limited in quantity or shared with another zone) include: *Montell* dart points; knife forms G and I; scraper forms C, E, and H; hand milling stones; worked bone tools; bison, terrapin, turtle, mussels, and snails.

2. Zone II contained material representing a subsequent

component of the Edwards Plateau Aspect. Primary traits: *Ensor*, *Fairland*, and *Frio* dart points; knife forms A, B, and C; burins, flake drills, scored stones; perforated mussel valves; deer, turtle, fish, mussels. Other traits: *Montell* dart points, knife forms F, G, I, J, and M; scraper forms D-H; hand milling stones; worked bone tools; terrapin, fox, mussels, and snails.

3. Zone III contained cultural material characteristic of the Central Texas Aspect. Primary traits: *Clifton*, *Granbury*, *Perdiz*, and *Scallorn*, arrow points; knife forms A, E, H, and L; scraper forms D, E, and I; gravers, gunflints, and pigment stones; potsherds, mussel shell pendants, scored mussel shell, European trade goods (glass bead, metal gun parts); bison, skunk, deer, fish. Other traits: miscellaneous dart points; knife forms F, G, and J.

CONCLUSIONS AND SYNTHESIS

Statement of Problems

Analysis of the archeological remains from the Wunderlich, Footbridge, and Oblate sites brings into focus certain problems which stem, to a large degree, from the relatively simple character of the collections and from the types of sites represented. These problems should be made explicit, as they have significant bearings on the interpretation of these (and similar) sites.

The Collections

The most outstanding features of the Canyon Reservoir collections are: (1) the low artifact yield, (2) the limited number of morphologically (or, less certainly, functionally and culturally) distinct types of artifacts, and (3) the high incidence of lithic artifacts. Specifically, 96% of the 355 artifacts from the Wunderlich Site are of stone, while 92% and 85% of the 396 and 1639 specimens from the Footbridge and Oblate sites, respectively, are lithic. The total number of objects recovered and the proportion of lithic artifacts to nonlithic specimens have been partially distorted by differential survival. That is, the Canyon Reservoir sites are so situated physiographically and climatically, that perishable artifacts were not preserved.

For archeological interpretations the relatively simple (especially lithic) character of the Wunderlich, Footbridge, and Oblate collections has important ramifications. In the first place, the sheer number of discrete cultural traits for unraveling archeological problems is greatly reduced. Not only are there relatively few specimens, but there are also few groups of types upon which chronologies, or functional and cultural relationships can be based.

Secondly, the tools, ornaments, etc., tend to be morphologically simple. They are usually more restricted by the materials from which they were manufactured and by the manner in which they were used than, for example, designs on pottery vessels. As a result, a culturally significant typology (both historically and functionally speaking) is difficult to establish. Comparisons of specimens are often tenuous since the chances of parallel development are great. A limited number of basic forms is possible for functionally effective projectile points. Design motifs on pottery or shell ornaments, by contrast, are less subject to physical restrictions (this, of course does not mean that there are no limitations). Thus, triangular points found

in Texas and in New York are probably not historically related. On the other hand, the designs on engraved conch shells from the Spiro Site very probably are related to similar designs which occur in Mesoamerica. At least, the chances of independent origin are greater in the former case than in the latter.

In brief, the collections are such that there are few variables to manipulate; moreover, it is difficult to evaluate, in cultural terms, the significance of the variations recognized.

The Sites

In addition to the problems encountered in dealing with the collections, the sites themselves pose certain difficulties. The Canyon Reservoir sites, like so many in Texas, are campsites believed to have been occupied intermittently by small groups of transient hunting and gathering peoples. Typically, these campsites lack discrete occupational features—such as houses and burials—with which artifacts might be found in tight cultural association. The occurrence of artifacts with well defined occupational features generally offers reliable associational data and provides a firm basis for the recognition and definition of culture complexes. In the absence of these features, associational data and hence inferences of relative age and cultural relationships must be derived from geological zones and/or arbitrary excavation levels. Such was the case at the Wunderlich, Footbridge, and Oblate sites.

A zone, however, may not have cultural significance. In fact, zones are not cultural entities; rather, they are units of accumulation either empirically defined by lithological changes in the deposit, or arbitrarily created (e.g., six inch levels, etc.) by the archeologist. In either case, a zone is not a product of cultural design, nor does it necessarily represent a single cultural unit.

To complicate the situation further, the nature of the accumulation may be complex: that is, the deposits may not have been laid down in neat horizontal layers. Moreover, natural and human disturbances may be difficult to recognize, at least more so than derangements to more discrete occupational features.

The problems posed by the nature of the Canyon Reservoir sites and collections are significant, but not insurmountable. They are limitations which, to a considerable extent, can be overcome by the critical analysis of well-

controlled, statistically significant samples. Regrettably, there are still relatively few such samples available from archeological sites in central Texas. Consequently it is not possible to make numerous broad statements. On the other hand, the data from the Canyon Reservoir sites, especially when compared with related materials, do suggest the outlines of some of the major developments in central Texas prehistory. These are presented below, with varying degrees of confidence.

Sequence and Chronology

Most significant of the conclusions to be drawn from the Canyon Reservoir sites are those dealing with chronology, particularly with the relative sequence of certain dart point types. Only a few of the other classes of artifacts yielded meaningful distribution patterns. The latter, since they can be dealt with more simply and since they offer relatively little new data, will be presented first:

1) All three sites contained arrow points which, in general, occurred stratigraphically above the dart points. At Wunderlich and Footbridge, however, the arrow points were infrequent and appeared to represent very brief occupations. No significant differences were observed in the distribution of the several arrow point types (namely, *Perdiz*, *Scallorn*, *Fresno*, and *Granbury*) found at these two sites. By contrast, arrow points were relatively common at the Oblate Site and, moreover, the *Perdiz* and *Clifton* types tended to overlie the *Scallorn* type (Tunnell, Table 4).

2) At both the Oblate and Wunderlich sites the arrow points were associated with undecorated pottery. (No pottery was found at the Footbridge Site.) Beyond its relatively late occurrence, however, little of consequence can be inferred from the distribution of pottery at either site. The Wunderlich sample is too small (five sherds) and is from the surface. The Oblate Site yielded more potsherds (194 specimens), but only one vessel appears to be represented.

3) Apart from the projectile points only one other type of lithic artifacts, Tunnell's Knife Form E, had obvious stratigraphic significance. This form—slender, more or less oval-shaped—was concentrated in the upper part of the Oblate Site deposits, in Zone III. Present evidence suggests that it is associated with both the *Scallorn* and *Perdiz* arrow point types.

4) Historic material was found at the Oblate and Footbridge sites. Stratigraphically it occurred in the uppermost portions of the deposits. All the historic items from the Footbridge Site and most of those from the Oblate Site can be attributed to recent, 20th century, occupations. However, some of the historic artifacts from Oblate—namely, gun parts and a single glass bead—are typologically distinct from the above and can be assigned to an earlier (perhaps 18th century) Indian (?) occupation. It is possible, but by no means certain, that these early historic artifacts may be associated with the *Perdiz* arrow point type at the Oblate Site.

Dart Point Sequence in the Canyon Reservoir Area

Of all the artifacts obtained from the Canyon Reservoir sites, the dart points had the most significant distributions: at all three sites they usually were found below arrow points and, when present, pottery and historic material; and at the Wunderlich and Oblate sites certain dart point types were found to be relatively older than other types. So far as specific sequential data are concerned, Footbridge contributes little. Presently it appears as if some of the deposits at this site (namely Zone A) may be secondary. For this reason the Footbridge Site is largely excluded from the following discussion.

Johnson in his analysis of the Wunderlich Site has presented evidence indicating important differences in the vertical and/or horizontal distribution of dart point types *Nolan*, *Pedernales*, *Bulverde*, *Montell*, *Frio*, *Ensor*, and *Provisional Type III*. Specifically, he concludes: (1) that the earliest occupation of the Wunderlich Site (Period I) is represented chiefly by types *Nolan* and *Bulverde*; (2) that a second and later occupation (Period II)—horizontally and, to a lesser extent, stratigraphically distinct—is characterized principally by the *Pedernales* type; (3) that Period II is overlain by a later, but lighter occupation (Period III) distinguished by types *Montell*, *Frio*, and *Ensor*; and (4) that there is a possibility that there was yet another, even briefer dart point occupation characterized chiefly by *Provisional Type III*. The last-named, however, was poorly represented and remains tenuous.

The stratigraphic occurrences of specific dart point types at the Oblate Site (Tunnell, Table 3), in general, support the findings made at the Wunderlich Site. At Oblate, however, the distributions are more overlapping and appear primarily as trends. While this pattern of occurrence may represent gradual replacements in dart point styles, it seems probable that it reflects to a greater degree: (1) the arbitrary levels employed in excavating the site, and (2) physical mixing of occupation zones. Regardless, the trends that can be observed are significant, and can be summarized as follows:

1) The deepest levels (Zone I) had as their most distinctive artifacts dart point types *Pedernales*, *Bulverde*, *Marcos*, and *Almagre*. Also occurring, but more characteristic of a later period, are types *Ensor*, *Frio*, *Marshall*, and *Montell*. In part, Zone I at the Oblate Site is equivalent to Johnson's Period II at the Wunderlich Site.

2) Stratigraphically above Zone I (in mixed Zone I and II, and in Zone II) are types *Ensor*, *Fairland*, *Marcos*, *Frio*, *Marshall*, and *Montell*. This period appears to equate with Johnson's Period III.

3) Of the above mentioned types, *Ensor*, *Frio*, and *Fairland* survived into somewhat later times (mixed Zone II and III,

and Zone III). An equivalent period appears to be lacking at the Wunderlich Site.

Dart Point Sequence in Central Texas

Recently reported data (T. C. Kelly, 1961) from the Crumley Site in Travis County give strong support to the findings made at the Wunderlich, and, to a lesser extent, Oblate sites. The deepest occupation zone, Stratum II, at the Crumley Site contained a large number of *Nolan* (41), *Travis* (54), and *Bulverde* (51) points, but only three *Pedernales* points. Stratum II was separated from the next occupation zone (Stratum IVa) by a comparatively sterile layer (Stratum III). In IVa only three *Nolan* and seven *Travis* points were found while, in sharp contrast, 146 *Pedernales* points were recovered. *Bulverde* points, on the other hand, occurred in only slightly smaller numbers (33) in Stratum IVa than in Stratum II.

Of the many other dart point types recognized at the Crumley Site, only a few were numerous enough to exhibit significant distributions. These include the *Montell* type which was found generally above *Pedernales* and *Bulverde* (in Stratum IVb); the *Lange* type which occurred mainly with *Pedernales* and *Bulverde* (in Stratum IVa); The *Marcos* type which was evenly split (4 specimens each) between Stratum IVa and IVb; and the *Langtry* type which, contrary to the situation at Wunderlich, was found chiefly in Stratum II (4) with *Nolan* and *Travis* types, rather than in Stratum IVa (1) with the *Pedernales* type.

Evidence from both the Wunderlich and Crumley sites strongly suggests that the *Travis* and *Nolan* types are older than the *Pedernales* type. However, convincing as these data are, there are a number of sites in central Texas where these types appear to have been contemporaneous. In fact, apart from early, largely undocumented and much ignored statements by J. E. Pearce (1932: 49, Pl. 10) and E. B. Sayles (1935: 53), there were no previous—at least obvious—indications of temporal differences in these specific dart point forms.

J. Charles Kelley (1947b; 1959; ms.) particularly has called attention to evidence indicating contemporaneity of the *Pedernales* (which he considers to be the major diagnostic of his Round Rock Focus) and *Nolan* (major diagnostic of his Clear Fork Focus) types. Recently (1959: 282) he has stated . . . "the contemporaneous Round Rock . . . and Clear Fork . . . foci extend from very early to very late times but are replaced locally on the west by the late Uvalde focus." Kelley based his argument for the contemporaneity of *Pedernales* and *Nolan* largely upon stratigraphic data from five central Texas terrace sites (Kelley, 1947b; ms.)—the Round Rock, Sandy Creek, Heffington, Grelle No. I, and Grelle No. II.

In the 40-foot (Govalle) and part of the 20-foot terraces of the Colorado River, he found *Pedernales* and *Nolan* points occurring throughout the excavations, although not many dart points of any type were encountered in the lowest levels.

These data are in apparent conflict with the findings made at the Wunderlich and Crumley sites, and it is difficult to reconcile satisfactorily this discrepancy. One interpretation might be that the materials from the sites analyzed by Kelley were considerably mixed, in spite of the presence of apparently clear-cut geologic strata at most of the sites. We cannot, however, readily put forth any explanation to show how these materials might have become mixed in such deep deposits. Until the sites in question have been fully published, it will not be possible to make any final appraisal of their stratigraphic significance. If, however, we assume a mixture of materials at the Colorado terrace sites, then the information from the Wunderlich and Crumley sites would not be in conflict.

An alternative interpretation of these data is to assume a partial contemporaneity for the *Pedernales*, *Travis*, and *Nolan* types, with the latter two forms appearing somewhat earlier than the former. Thus, J. Charles Kelley's sites could date entirely from the hypothetical period of contemporaneity, and would therefore be somewhat later than the lowest zones—and earlier than the upper zones—of the Crumley and Wunderlich sites. It is, however, difficult to believe that the extensive alluvial deposits (the 40-foot and part of the 20-foot terraces) in which these sites are buried could date entirely from such a period.

Other alternatives could be suggested, but this kind of speculation is not profitable. In sum, we seemingly have good stratified sites with apparently contradictory evidence. Only the excavation and reporting of other sites in the area can ultimately resolve the discrepancy.

One other site which might appear to contradict the evidence from Wunderlich and Crumley deserves to be mentioned here. This is the Williams Site, located in Travis County, which was reported by Suhm (1959). At this open campsite horizontal differentiation in the occurrence of various dart point types was discerned, although vertical stratigraphy was slight. However, a suggested sequence of occupations, based on six major dart point types, was worked out by Suhm. This consists of period 1, the earliest habitation, represented by a predominance of *Travis*, *Bulverde*, and *Pedernales*, with *Nolan* as a very minor type. The second period is characterized by an increased popularity of *Nolan* and a decline of *Travis* and *Bulverde*, while *Pedernales* points continue. Period 3, for which good stratigraphic evidence was available, is marked by the appearance of *Darl* and *Ensor*, while period 4 is an arrow point horizon. The immediate problem

is the relative chronological position of the materials of periods 1 and 2, with *Nolan* appearing seemingly later than *Pedernales*. There was, however, virtually no stratigraphic differentiation to support this ordering, and it was merely presented as a hypothesis. Suhm has reappraised the situation at the Williams Site and suggests that the reverse interpretation is also possible; *i.e.*, that the period 2 artifacts with large numbers of *Nolan* points could precede the materials grouped under period 1. This latter possibility would bring the Williams Site more in line with the information obtained from the Wunderlich and Crumley sites and, for that reason, seems to be the most reasonable alternative. The difference in distribution between the *Nolan* and *Travis* types at the Williams Site, however, remains at variance with data from Wunderlich and Crumley.

While the chronological ordering of the *Nolan*, *Travis*, *Bulverde*, and *Pedernales* points must be considered as tentative, there is good evidence to indicate that these four types are generally earlier than such forms as *Montell*, *Marcos*, *Frio*, and *Ensor*. Stratigraphic data from both the Oblate and Wunderlich sites overwhelmingly favor a later temporal position for the latter types. These findings, however, are not new. J. E. Pearce in 1932 (Pl. 10) considered comparable dart points as belonging to his upper level kitchen midden culture. (He also included in this level other forms—namely, arrow points and *Darl* type dart points—which we now believe to be even later.) Then, in 1935, E. B. Sayles defined a Late Edwards Plateau Culture which, in part, was distinguished by dart points now identified as types *Frio* and *Ensor*. The same year Vane Huskey published a slightly more detailed sequence of dart points found in his mound A sites in the Nueces Canyon. In terms of the present point classification (Suhm *et al.*, 1954), Huskey (1935: 108, Pl. 14) placed the *Pedernales* and *Kinney* types in the lower level; *Montell*, *Marcos*, and *Castroville* (?) types in the middle level; and *Ensor* and *Frio* types in the upper level.

The most explicit statements, however, on this chronology have been made by J. Charles Kelley (1947a; 1948; 1959) who considers the *Frio* and *Montell* types* as the major diagnostics of his Uvalde Focus. Specifically, he states (1948: 77–78):

.... It [the Uvalde Focus] represents the culture of a hunting and food collecting group of the Edwards Plateau [Aspect] and

* The point types used in this report by and large follow Suhm, Krieger, and Jelks (1954), and it is not always possible to equate these types precisely with the types used by Kelley. However, the present definitions of *Frio* and *Montell* appear to correspond reasonably well to Kelley's *Frio Flared Stem* and his *Montell Split Stem*. On the other hand, Kelley's *Smithwick Small Stem*, which he also links with the Uvalde Focus, does not have an obvious equivalent in the present typology. It may, in part, be included in the *Marshall* type of Suhm, Krieger, and Jelks.

is characterized by the use of specialized dart points with notched bases or with flaring, indented-base stems. Stratigraphically, it overlies the older Round Rock Focus of the Balcones phase, but seems to have been replaced in turn by the Toyah Focus, and related cultures, attributed to the Ju-mano Indians and their associates who inhabited the area in historic times. The Uvalde Focus itself is closely related to the Chisos Focus of the Big Bend Aspect and if contemporaneous with that focus probably was best developed between *circa* 1000 and 1400 A.D.

The relatively late position of *Montell*, *Frio*, *Marcos*, and *Ensor* points seems reasonably well established. In fact, one of the few bits of conflicting evidence is from the Footbridge Site, where a small number of *Pedernales*, *Bulverde*, and *Travis* points were found to occur higher in the stratigraphic column than *Frio*, *Marshall* and other, possibly related types (Suhm, Table 2). While the situation at Footbridge is not easily explained away, it does not, at the present time, seem important.

When the data from the Oblate Site and from other recent excavations in central Texas are examined closely, there appear to be slight, but significant temporal differences in the distribution of types within this late Archaic material. More particularly, the stratigraphic findings at the Oblate (Tunnell, Table 3), Crumley (Kelly, 1961: Table I), and Collins (Suhm, 1955: Table II) sites suggest that the *Montell*, *Marcos*, *Marshall* and possibly *Castroville* types appeared in central Texas somewhat before the *Frio* and *Ensor* types. Interestingly enough, this virtually duplicates an earlier, but less well documented sequence presented by Huskey (1935: Pl. 14).

At Wunderlich (Johnson, Table 1), Collins, Williams, Smith, (Suhm, 1955; 1957; 1959), and Kyle (Jelks, 1962) sites there are hints of an even later cluster of dart points. Unfortunately, however, the typology of this group has not been well established. Nevertheless, present evidence suggests a very late Archaic period—perhaps transitional between the Archaic and Neo-American stages—characterized by small, expanded or rectangular stem dart points. Probably to be included in this group are Johnson's *Provisional Type III* (p. 30, herein), and the *Darl* (Suhm *et al.*, 1954: 414, Pl. 86) and *Godley* (Jelks, 1962: 40, Fig. 16, A-E) types. Stratigraphic data from the Wunderlich, Collins, and Williams sites seem to indicate a very late Archaic date for *Darl* and *Provisional Type III*; while the Kyle Site (Jelks, 1962, Table 1) suggests that the *Godley* type may have continued into early Neo-American (specifically Austin Focus) times. The Smith Site—where the deepest zone contained dart point types *Darl* (16 specimens) and *Ensor* (two specimens), and, in the upper portion, arrow point type *Scallorn* (three specimens)—may possibly be one of the “purest” components yet reported for this rather tenuous period. This site, as well as

the Collins and Williams sites, suggest that *Darl* and *Ensor* may overlap one another, with *Ensor* appearing somewhat earlier, and *Darl* continuing in existence somewhat later.

To recapitulate briefly, the gross outlines of a relative sequence of dart point types have been suggested for central Texas. It is a tentative scheme which in general, but not entirely, is supported by archeological findings made thus far in central Texas. Although these data are only suggestive, and by no means conclusive, we believe that they can advantageously be grouped into a series of four time periods (Fig. 45), each of which is characterized by certain dart point types. These are, from early to late:

1) THE EARLY ARCHAIC PERIOD represented chiefly by dart point types *Nolan*, *Travis*, and *Bulverde*.

2) THE MIDDLE ARCHAIC PERIOD characterized principally by dart point types *Pedernales* and *Bulverde*. *Bulverde*, however, appears somewhat less frequently than in the Early Archaic period.

3) THE LATE ARCHAIC PERIOD distinguished by types *Montell*, *Marcos*, *Frio*, and *Ensor*. Other forms, particularly *Castroville*, *Marshall*, and *Fairland*, perhaps belong to this period, but the present findings do not warrant their inclusion at this time. There is additional evidence suggesting that the *Montell* and *Marcos* types appeared somewhat before the *Frio* and *Ensor* types. Thus, if this period becomes firmly established, it may be possible to recognize late and early phases.

4) THE TRANSITIONAL ARCHAIC PERIOD, probably the most tenuous of the four, is characterized by *Darl*, *Provisional Type III* and, less certainly, *Godley*. The *Ensor* type appears to have continued in use into the early portion of this period.

It must be emphasized that these periods are presented as hypotheses and that their validity and utility remain to be demonstrated. Clearly there are many problems yet to be solved. For example, a number of the Archaic dart points types—including *Tortugas*, *Kinney*, *Lange*, *Ellis*, *Martindale*, and *Palmillas*—which occur consistently, but not commonly, in central Texas sites cannot be assigned, even tentatively, to any of the four periods. Perhaps even more important, the areal sample is small and a more complicated picture, reflecting spatial as well as temporal variations in dart point styles, can be expected to emerge in the future. Lastly, it should be noted that the extent of overlap or continuity between periods, as implied by the survival of certain dart point types, is not at all evident. The problem of recognizing survival of a type is greatly complicated by the possibility of mixture in multi-component sites. The Crumley Site, to illustrate this problem, contained 41 *Nolan* and three *Pedernales* points in Stratum II, and three *Nolan* and 146 *Pedernales* points in Stratum IVa. Although it is possible that the *Nolan* points in IVa and the *Pedernales* points in II represent a slight

overlap in their temporal distribution, it can be argued equally as well that this distribution is the result of slight mixture between the two strata.

Absolute Age of Archaic Dart Point Sequence in Central Texas

Turning to the questions of age and duration of each of the four periods, there are relatively little data to support an absolute chronology. Few radiocarbon dates have been obtained for Archaic sites in central Texas, and those reported (Campbell, 1961; T. C. Kelly, 1961: 266; Stipp *et al.*, 1962) appear to be in conflict with one another.

Three radiocarbon dates have recently been released for the Wunderlich Site (Stipp *et al.*, 1962). Two samples with dates of 3455 ± 300 b.c. and 2555 ± 300 b.c., respectively, are from Area A, Stratum B and should be referable to the Early Archaic (Johnson's Period I). The third sample, from Area B, yielded a date of 2220 ± 200 b.c. It should date some portion of the Middle Archaic Period (Johnson's Period II). While the two dates from Area A, Stratum B, are appropriately older than the one from Area B, the 900 year difference between the two Area A dates seems inconsistent.

The only C-14 date from the Crumley Site (T. C. Kelly, 1961: 266) indicates an age of 1315 ± 125 b.c. for Stratum II, which we have identified as Early Archaic. The discrepancy—over 1,000 years—between this date and the youngest of the Early Archaic dates from the Wunderlich Site appears to be unreasonable.* In sum, so few radiocarbon dates have been obtained from Archaic sites in central Texas that it is neither realistic nor profitable to speak of an absolute chronology. In addition, any attempt to reconcile the observable discrepancies in the few dates available is futile at the present time.

Dart Point Sequences in Areas Adjacent to Central Texas

Although the succession of dart point types outlined above, as well as the more tenuous Early, Middle, Late, and Transitional Archaic periods, are not firmly established, it seems appropriate that brief comparisons be made with regions adjacent to central Texas. Broader correlations will eventually be necessary, but are not at the

* Although beyond the scope of this paper, it should be noted that radiocarbon dates (ranging from 8415 ± 110 b.c. to A.D. 905 ± 55) from presumed Archaic levels at the Kincaid Site in Uvalde County (Stipp *et al.*, 1962) appear to be in even greater conflict with those from Wunderlich. However, Kincaid has not been fully published and we are not prepared to evaluate the situation at that site. For these reasons we have excluded Kincaid from any of the above discussions.

Archaic

TYPE SITES	POINT TYPES	TIME PERIODS	STAGES
Blum Smith Kyle			
Blum Smith Kyle	<p>Perdiz Clifton Granbury Scallorn</p>	(TOYAH FOCUS) (AUSTIN FOCUS)	Neo - American
Wunderlich Smith Williams Collins	<p>Prov. Type III Dari</p>	TRANSITIONAL	
Oblate Wunderlich Collins	<p>Ensor Montell Frio Marcos</p>	LATE	
Wunderlich Crumley	<p>Pedernales Bulverde</p>	MIDDLE	
Wunderlich Crumley	<p>Nolan Travis Bulverde</p>	EARLY	
STORY	<p>Story</p>		Paleo - Indian

FIGURE 45. Tentative sequence of certain Archaic dart point types and time periods in Central Texas.
Sites where these periods are well represented are indicated on the left.

present time practical. Ideally, these comparisons should be based upon sound chronologies, both absolute and relative, and upon demonstrable typological affinities. Unfortunately, so few Archaic sequences have been conclusively established for Texas that the correlations mentioned below are necessarily restricted and of a tentative nature.

As has already been noted by J. Charles Kelley (1959: 285-286), there are many stylistic similarities between Archaic points in central Texas and those in western Texas. In addition, recent excavations in the Amistad Reservoir area, Val Verde County, (Epstein, 1960a; Johnson, 1961) have revealed a sequence of dart point types which strikingly parallels that suggested for central Texas. One site in particular, Devils Mouth, contained a remarkable sequence which extended from Paleo-Indian to Neo-American times and which included a number of stratigraphically distinct Archaic occupations. However, only the first season's work has been reported (Johnson, 1961); materials from the second season's excavations are currently being analyzed by LeRoy Johnson, Jr. A detailed statement on this site is not appropriate, but it is significant to note that the Archaic occupations, like those in the Canyon Reservoir area, can be divided into several periods with each period being characterized by certain dart point types. In fact, a number of specific dart point types are shared with central Texas. The uppermost Archaic levels at the Devils Mouth Site contained small expanding stem points, *Provisional Type C* (Johnson, 1961), which are virtually identical to *Provisional Type III* from the Wunderlich Site. Thus, the upper Archaic zones at Devils Mouth appear to equate very closely with what we have termed Transitional Archaic. Generally below *Provisional Type C* are *Montell* and *Ensor* points, which strongly suggest the Late Archaic Period. *Montell* and *Ensor* points, in turn, are generally underlain by *Shumla* and *Langtry* points. The latter two types occupy a relative position paralleling that of *Pedernales* points in central Texas and, hence, may represent a Middle Archaic Period. Somewhat closer stylistic ties with central Texas—specifically with the Early Archaic Period—are evident in even deeper zones at the Devils Mouth Site, which yielded small numbers of *Travis* and *Pandale* points. Although the sequence at the Devils Mouth Site has been somewhat simplified here, it fully confirms the findings in central Texas.

Epstein (1960a), also working in the Amistad Reservoir area of western Texas, reports a more generalized sequence in which he suggests a succession of groups or series of points. In particular he notes that (1960a: 27):

Since both gross and fine separations have value for different levels of culture analysis, it seemed advisable to consider the fact of intergradation as well as the finer type or sub-distinc-

tions in this report. The category of *series* has been devised for that purpose.

Epstein recognizes three series: the Stemmed (which includes types *Almagre*, *Langtry*, and *Shumla*), the Notched (which includes types *Ensor* and *Frio*), and the Lanceolate (which includes types *Abasolo*, *Catán*, *Desmuke*, *Kinney*, *Lerma*, *Pandora*, and *Tortugas*). At the two sites reported by Epstein he was able to demonstrate a sequence from stemmed dart points to notched dart points. However, no definite trends were obtained in his Lanceolate Series, although he thinks that there is a strong possibility that the *Lerma* points of this category are quite early. Thus, in a general way, Epstein's data support our findings, with his Notched Series being equivalent to the Late Archaic and the Stemmed Series representing the Middle Archaic. Perhaps equally as significant is Epstein's formal recognition of broader styles. Although this approach has not yet been fully developed, the possibility of relating a series of stylistically similar types over a fairly large area may prove to be very useful (see also Kelley, 1959). This more generalized approach, if used wisely, may very well reveal broader patterns and more significant relationships.

Although considerably removed from central Texas, brief mention should be made of Richard MacNeish's (1958: 58-62) dart point sequence for the Sierra de Tamaulipas, Mexico. Few of the specific dart point types found in central Texas occur in Tamaulipas, but it is significant to note that MacNeish found (1958: 58):

Projectile points decrease in size from early to late. Notched and unstemmed precede large stemmed and notched ones, and these in turn precede small notched and unnotched types.

This in a very general way suggests the findings made in central Texas. However, none of the "stemless" points (e.g., *Tortugas*, *Pandora*, etc.) in central Texas can, at the present time, be shown to have meaningful temporal distributions.

Continuing to look at broad patterns, an interesting sequence of Archaic dart point styles in northeastern Texas and adjacent parts of Oklahoma has recently been worked out by LeRoy Johnson, Jr. (ms.). This sequence seems to be almost the reverse of that in central Texas, for an Expanded Stem Series (with *Yarbrough*, *Ellis*, and other types) can be shown to be earlier than a Contracting Stem Series (represented principally by the *Gary* type). There is, however, one notable similarity: the latest dart point type, *Gary*, tends to become smaller through time. In general, the later the *Gary*, the smaller it is. In central Texas the Transitional Archaic points are usually smaller than earlier dart points. Nevertheless, the central Texas dart points both in terms of specific types and in broader

stylistic trends show a much stronger affinity to the west than to the east.

The only other Archaic sequence established in Texas occurs in the Upper Trinity drainage. Here the Carrollton Focus has been found to be earlier than the Elam Focus (Crook and Harris, 1952). Both foci are assigned to the Trinity Aspect. The Carrollton Focus shows some general similarities with the Archaic of central Texas (the Edwards Plateau Aspect), but, so far as dart point types are concerned, it cannot be precisely aligned with any of the four periods we have suggested. The one radiocarbon date, 3986 ± 200 b.c. (Campbell, 1961), indicates, however, that it is fairly early. The later Elam Focus shows even less similarities with central Texas and appears to be more closely allied with eastern Texas.

Cultural Affiliations

The major cultural affiliations of the occupations at the Wunderlich, Oblate, and Footbridge sites are easily assessed. Each site has as its earliest and principal component the Archaic Edwards Plateau Aspect. (The few Early Man points, one *Meserve* and two *Angostura*, found at these sites do not appear to represent Paleo occupations.) The Edwards Plateau Aspect materials are generally overlain by artifacts attributable to the Neo-American Central Texas Aspect. The latter component, however, was significantly represented only at the Oblate Site. Finally, both the Footbridge and Oblate sites yielded evidences of light historic occupations. All of the historic artifacts from Footbridge, and most of those from Oblate, can be referred to very recent, 20th century, occupations. On the other hand, several historic objects—including seven gunflints, a glass bead, a trigger, and a musket or rifle side plate—from the Oblate Site clearly belong to an earlier, probably 18th century occupation. However, the exact age and cultural affiliations (i.e., if Indian, what

group?) of this latter material remain undetermined.

More specific cultural units, termed foci, have been recognized for both the Edwards Plateau and Central Texas aspects (Kelley, 1947a; 1947b; 1948). As originally defined by Kelley, (see Introductory section for a fuller discussion) each focus was distinguished principally by one or more projectile point types. For the Central Texas Aspect, Kelley (1947a) recognized a Toyah Focus and an Austin Focus, with the *Perdiz* arrow point type as the major diagnostic of the former, and the *Scallorn* arrow point type as the major diagnostic of the latter. Recent excavations in Central Texas Aspect sites (Jelks, 1953; Suhm, 1957; Jelks, 1962) have shown the Austin Focus to be earlier than the Toyah Focus. In addition, research by Jelks (1962: 85–90) has greatly amplified Kelley's original definitions.

Following the definitions presented by Jelks (1962), both foci are represented at the Oblate Site, with the Austin Focus generally earlier than the Toyah Focus. By contrast, the Central Texas Aspect occupations at the Wunderlich and Footbridge sites are so light that they cannot definitely be identified with either focus.

The status of the three Edwards Plateau Aspect foci—the Clear Fork, Round Rock, and Uvalde—remains uncertain. In brief, the problem has been the failure to demonstrate that these foci are valid culture complexes, since only certain Edwards Plateau Aspect dart point types can presently be shown to have significant distributions. Perhaps (as was the case for the Central Texas Aspect) once a chronology of point types has been firmly established, researchers will begin to examine in more detail the typology and distribution of other classes of artifacts (knives, scrapers, etc.) and will eventually be able to verify or re-define the Edwards Plateau Aspect foci. Such an undertaking, however, is beyond the scope of this paper and, for that reason, we have not attempted to identify any of the Edwards Plateau Aspect occupations at the Canyon Reservoir sites with a specific focus.

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